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FOTON

VOLUME 1

VOLUME 2

VOLUME 3

INTRODUCTION

HOW TO USE

OVERVIEW

1 . Overview

(a) This manual offers general information on repair services. Following this instrument will help to ensure service quality and efficiency.

(b) In general, repair service consists of three components as follows:

- Diagnostics
- Replacement (removal & installation), disassembly and assembly, and (on-vehicle) inspection and adjustment

(c) This manual focuses on "Diagnostics" (refer to "Chapter 4. Diagnostics") and "Replacement (removal & installation, Disassembly & Assembly and (On-vehicle) Inspection and Adjustment", while excluding "Final Check".

(d) This manual doesn't involve the following important operations in practical services:

- Jack or lift operation
- Cleaning of removed parts if needed
- Visual inspection

2 . Index

(a) There is a glossary index at the end of this manual, for your reference.

3 . Preparation

(a) Chapter 2 "Preparation" of this manual lists the specialized and recommended tools, equipments and supplies required by repair services, which shall be used exactly following proper processes.

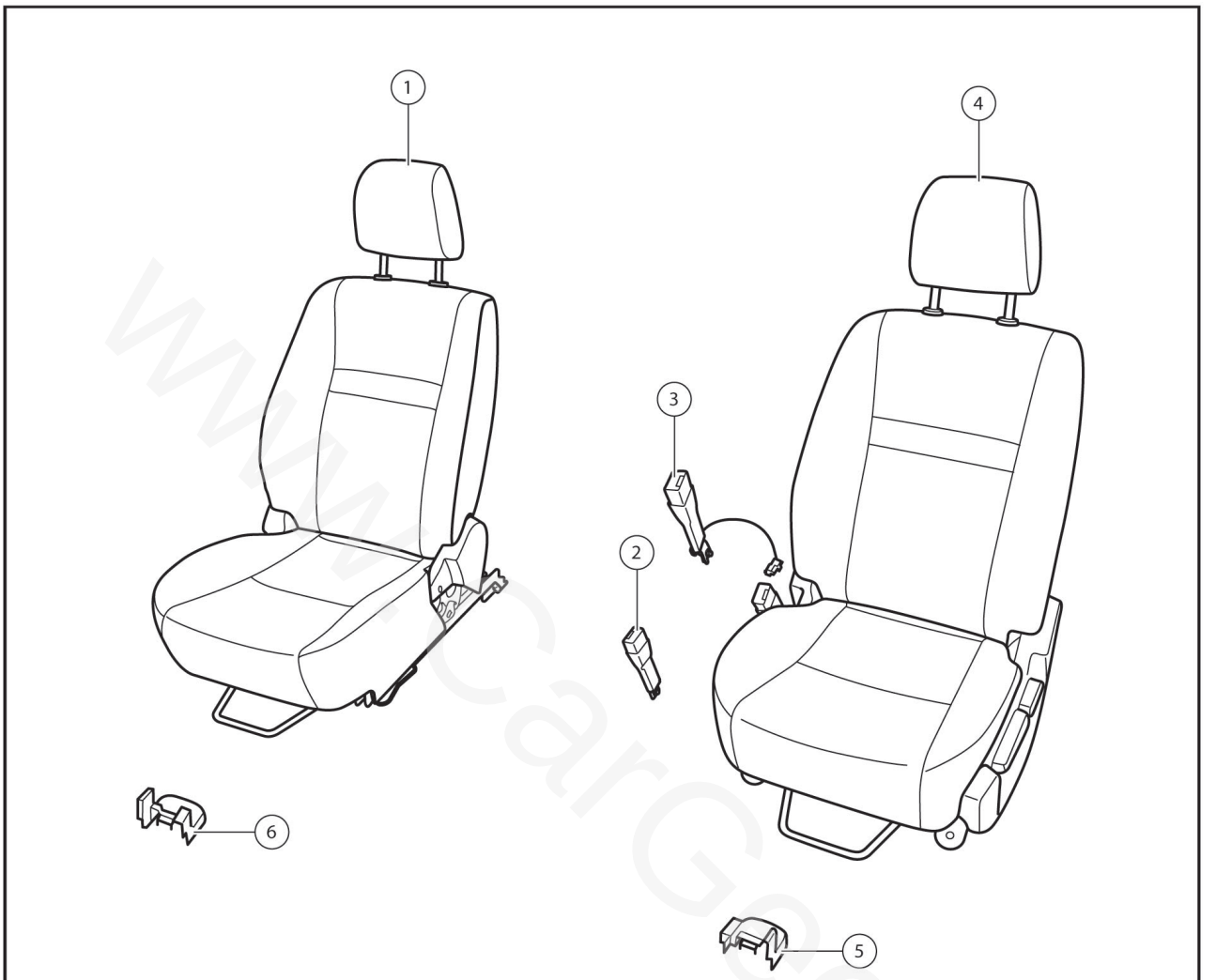
4 . Repair Process

(a) Depending on chapters, part diagrams are presented for system description.

(b) In exploded view, the part diagram clearly states the assembling relationship between the parts, followed by a table of part names.

01

Example:



ftwx840021

1	Driver Seat Assembly
2	Driver Seat Belt Buckle
3	Front Passenger Seat Belt Buckle
4	Front Passenger Seat Assembly
5	Left Bolt Cover
6	Right Bolt Cover

ftwx010001

(c) If the installation process is simply the opposite to the removal, only the key points are illustrated.

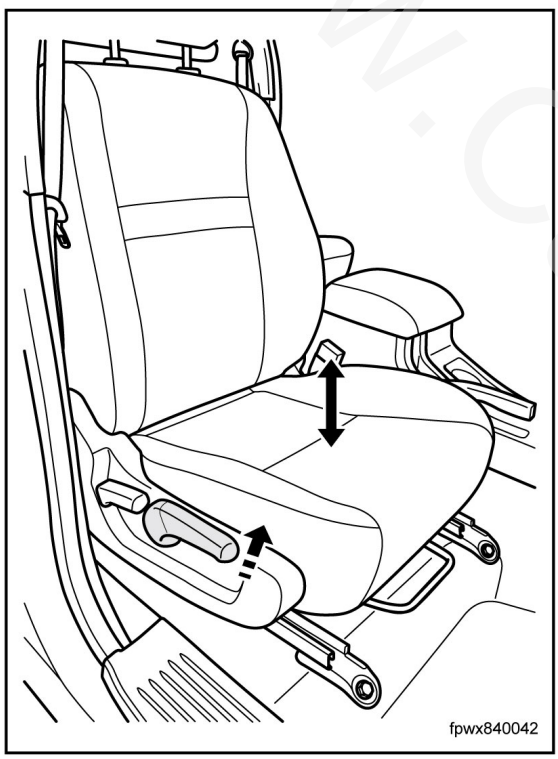
(d) The repair process presented in this manual only focuses are important steps, completed by illustrated operation targets and actions. The process description states the detailed operations, standards and precautions.

(e) Some similar models may share the same illustration in this manual. In such case, the content may be slightly different from the actual model.

(f) The process is presented as follows:

- The process illustration describes "what and where to do".
- The process heading explains "what to do".
- The process description states "how to do" and offers "Repair Standard", "Repair Warning" and other information.

Example:



6. Adjust the height of the seat

a) Pull up the height adjustment handle.

b) The seat is lifted when the the handle is pulled uprepeatedly, until it reaches a proper height.

ⓘ Attention

If the seat no longer moves upward, it means it is at the peak.

ftwx010002

5 . Repair Standard

(a) In this manual, repair standards are in bold fonts, so that you don't need to look it up while stopping your work at hand. The related information is also listed in Chapter 3 "Repair Standard" for quick reference.

6 . "Danger", "Warning" & "Attention"

Danger	**In bold, it explains the potential personal injuries on you or others.**
Warning	**In bold, it represents potential damage to the part under service or the equipment in use.**
Attention	**In bold, it provides further information on repair service.**

7 . Unit: international measurement unit.

(a) All units used in this manual are international measurement units (SI units).

Example:

Torque: 30 N•m

8 . Applicable vehicles.

Drive manner	Product line	Engine	Transmission	Product model
Right-hand	H-series standard diesel-fueled	ISF2.8-120kw	JC538	BJ1037V3MD6-R
				BJ2037Y3MDV-R
		ISF2.8-96kw	038	BJ1037V3KD6-RA
		ISF2.8-120kw	JC538	BJ1037V3LD6-RA
	H-series standard gasoline-fueled	4G69-100kw	5DYG	BJ1037V3MX6-RB
				BJ1037V3KX6-RB
	H-series premium diesel-fueled	ISF2.8-85kw	JC530	
	S-series standard diesel-fueled	ISF2.8-96kw	038	BJ1037V3KD6-RE
				BJ1037V3LD6-RE
				BJ1037V3MD6-RE
	S-series premium diesel-fueled	ISF2.8-85kw	JC530	BJ1037V4KD6-RC
				BJ1037V4MD6-RC
Left-hand	H-series standard diesel-fueled	ISF2.8-120kw	JC538	BJ1037V3MD6-AA
				BJ2037Y3MDV
		ISF2.8-96kw	038	BJ1037V3MD6
				BJ1037V3KD6-AA
		ISF2.8-120kw	JC538	
	H-series standard gasoline-fueled	4G69-100kw	5DYG	BJ1037V3MX6-BB
				BJ1037V3KX6-BB
	H-series premium diesel-fueled	ISF2.8-85kw	JC530	
	S-series standard diesel-fueled	ISF2.8-96kw	038	BJ1037V3KD6-EE
				BJ1037V3MD6-EE
	S-series premium diesel-fueled	ISF2.8-85kw	JC530	BJ1037V4KD6-3
				BJ1037V4MD6-3

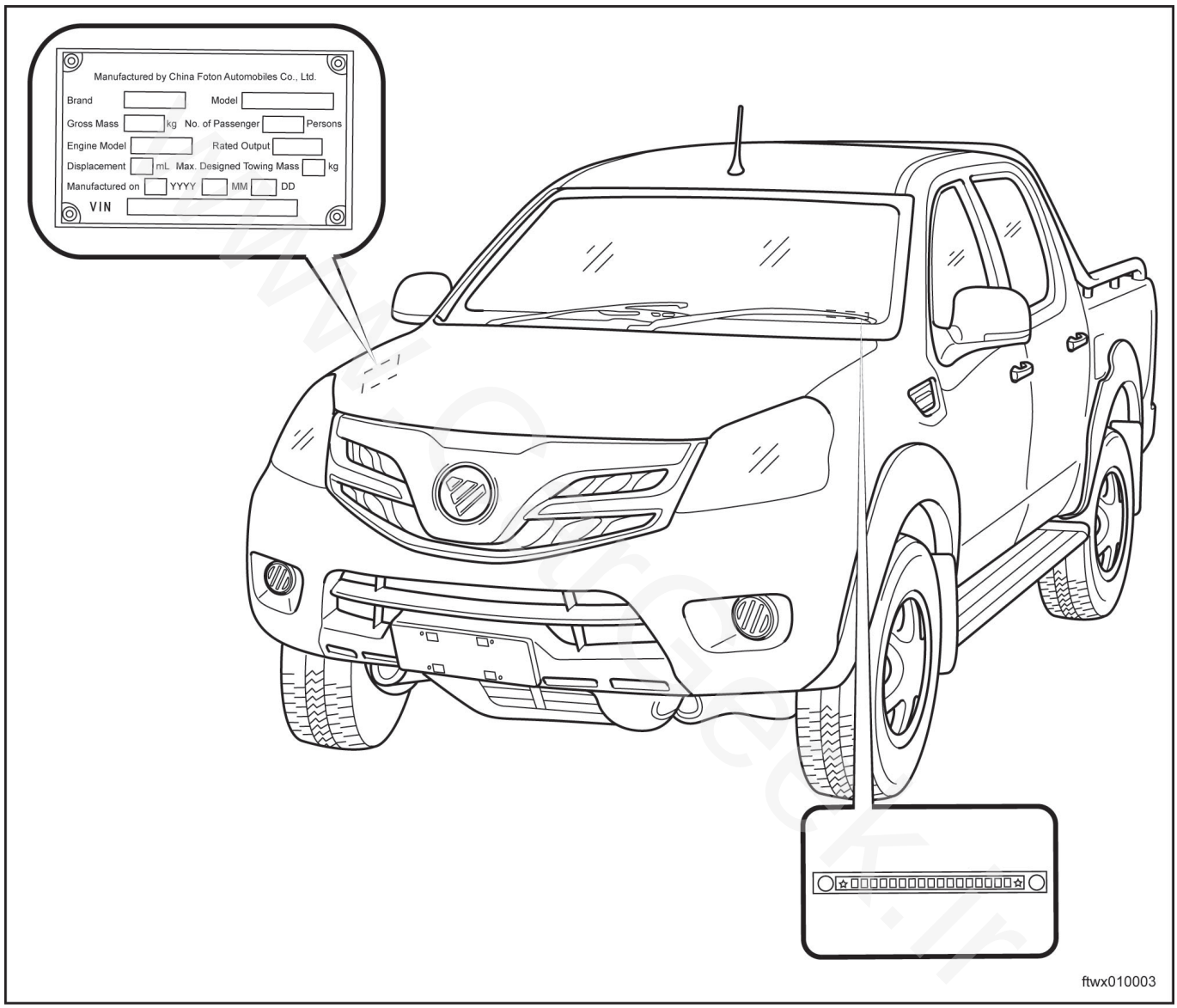
IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER (VIN)

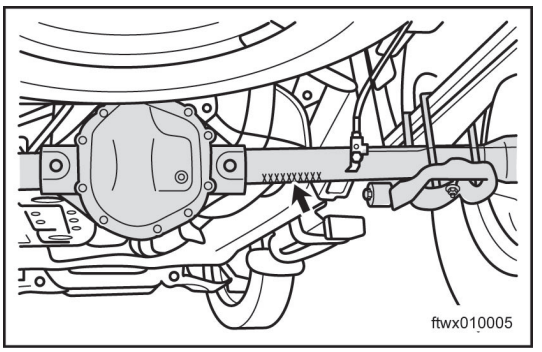
1 . Vehicle Identification Number (VIN)

(a) As illustrated, vehicle identification number (VIN) is pressed on VIN label and VIN plate.

- VIN label - at the front right part of the dashboard, it is visible via the front windscreen.
- VIN plate - it can be seen when the engine hood is open.

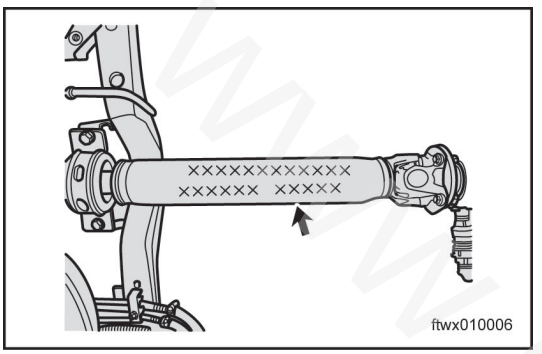


SERIAL NUMBER (SN)



1 . The serial number of the rear drive axle.

(a) The serial number of the rear drive axle is stamped on the axle tube.



2 . Transmission Shaft SN

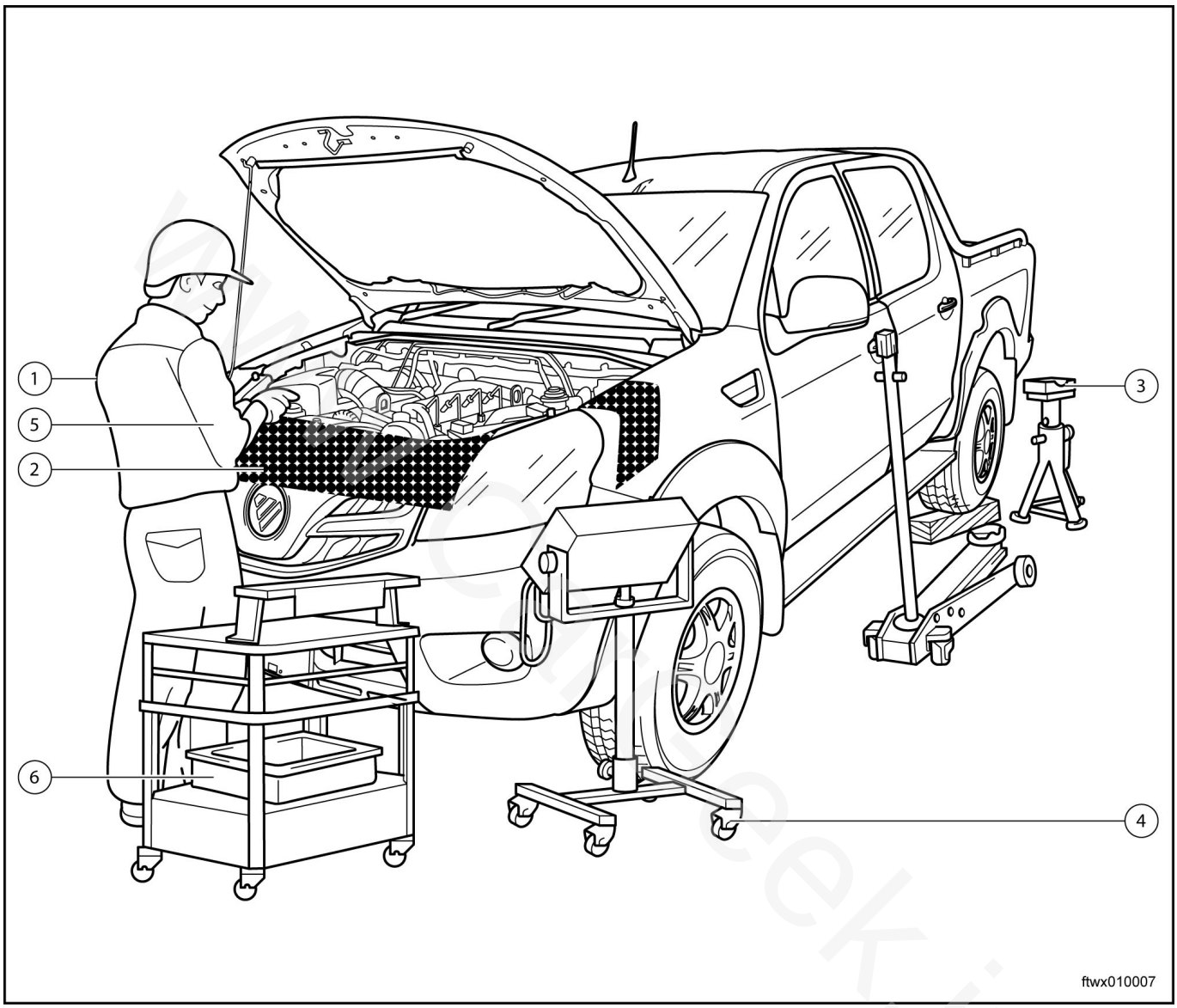
(a) Transmission shaft SN is printed on the transmission shaft tube.

GENERAL SERVICE GUIDELINE

OPERATION PRECAUTION

1 . Basic Precaution

(a) Service Precaution



1	Clothes	• Wear clean working uniform. • Wear protective hamlet and shoes.
2	Vehicle Protection	• Before service, prepare the front grill pad, wing pad, seat cover and carpet.
3	Safe Operation	• Be careful of the others when working with other coworkers. • When servicing when the engine is on, keep the workspace well ventilated. • Wear necessary protective equipments when working on hot, rotating, moving or vibrating parts, to avoid burn or injury. • When lifting the vehicle, work on the specified supporting points and ensure it is securely supported. • When lifting the vehicle, use safe and qualified equipments.

4	Preparation of Tools & Measuring Devices	• Before service, prepare the tool shelf, dedicated tools, measuring devices, vehicle supplies, cloth and spare parts.
5	Removal, Installation, Disassembly & Assembly	• Perform complete analysis and diagnostics on the defect and take effective solutions. • Before removing a part, check its general situation for distortion or damage. • If the part is complicated, note down the steps or make necessary marks to avoid functional failure. • Clean the removed parts if needed and install them after overall inspection.
6	Removed Parts	• Place the removed parts in order and prevent them from confusion or contamination. • Once removed, replace O-ring, self-locking screw and other disposable parts according to this manual. • Keep the removed parts for customer reference.

(b) Lifting & Supporting Vehicle

- When lifting and supporting the vehicle, be careful to work on the right positions. (Refer to "Chapter 1. Introduction - service guideline, vehicle lifting and supporting positions")

(c) Glued Parts

- Glued parts refer to the bolts, nuts and other parts applied with sealant before delivery.
- If it is necessary to release, refasten or move a glued part by any means, reapply the specified sealant.
- To reuse a glued part, clean and remove the original sealant, blow it dry with compressed air and apply the specified sealant onto the bolt, nut or thread.

! DANGER

Check the torque subject to the lower limit of the torque requirement.

- When using sealant, in some cases, it is necessary to wait for a while until the sealant becomes hard.

(d) Gasket

- Add a gasket on the lining if necessary, to avoid leakage.

(e) Bolt, Nut & Screw

- Tighten them exactly following the specified torque with torque wrench.

(f) Fuse

- When replacing fuse, ensure the rated current of the new fuse is qualified. Don't use any fuse incompliant with the rated current.

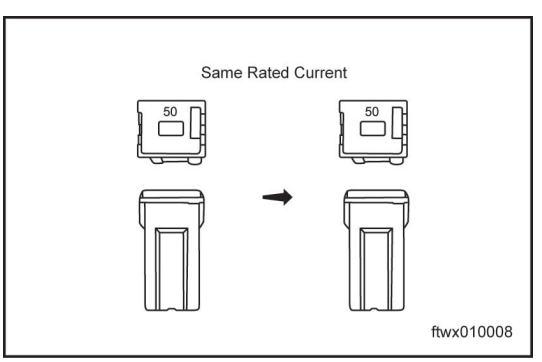
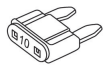


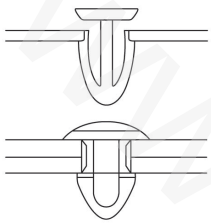
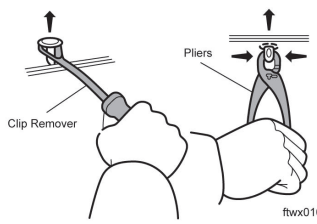
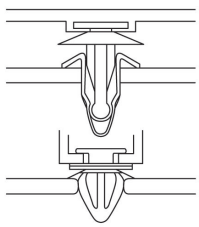
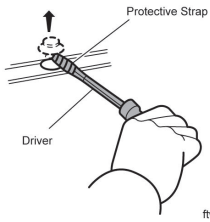
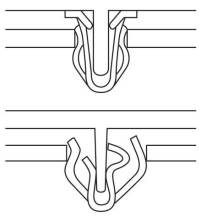
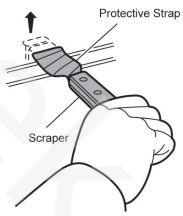
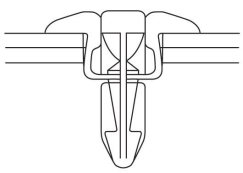
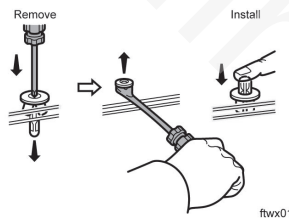
Illustration	Symbol	Part Name	Abbrevation
 ftwx010009	 ftwx010012	Fuse	F
 ftwx010010	 ftwx010013	Fuse Link	F/L

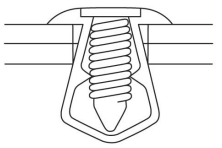
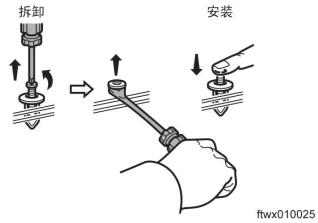
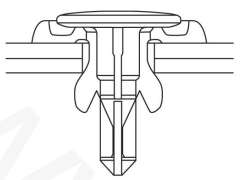
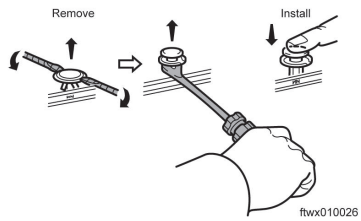
(g) Clip

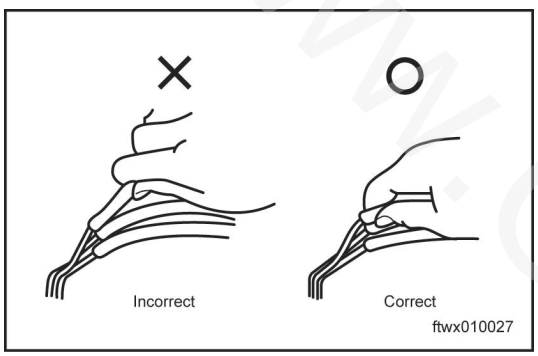
- See the table blow for the installation and removal of clips regularly used for vehicle parts.

⚠ **CAUTION**

If a clip is damaged during service, replace a new one.

Shape (Example)	Removal & Installation
 ftwx010015	 ftwx010021
 ftwx010016	 ftwx010022
 ftwx010017	 ftwx010023
 ftwx010018	 ftwx010024

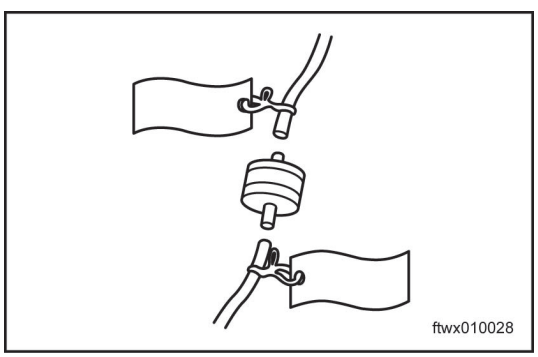
Shape (Example)	Removal & Installation
 ftwx010019	 ftwx010025
 ftwx010020	 ftwx010026



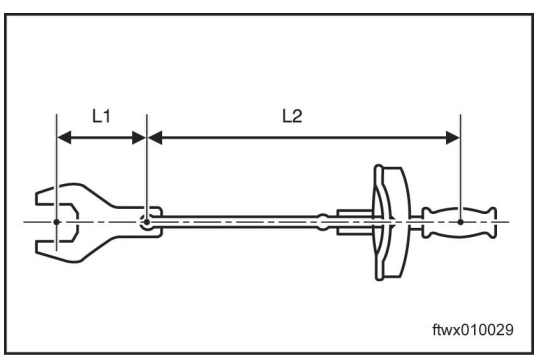
ftwx010027

(h) Removal & Installation of Vacuum Hose

- When removing and installing vacuum hose, grab the end of the hose, instead of the middle.


ftwx010028

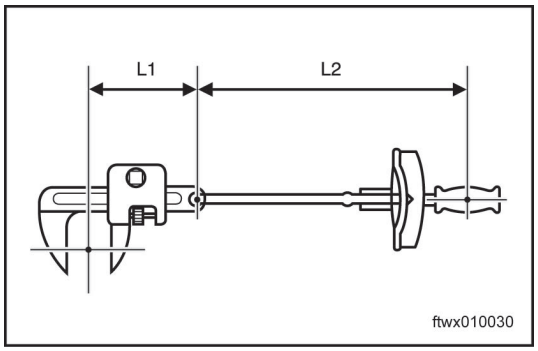
- **When disconnecting a vacuum hose connector, label it to faciliate the identification upon connection.**
- **After removal and installation, check carefully whether the vacuum hose is correctly connected.**
- **When using vacuum pressure gauge, if the connector is too large, don't directly connect it to a vacuum hose. Use a specialized adapater instead. If the vacuum hose is expanded, leakage may occur.**



ftwx010029

(i) Use a Torque Wrench with Extended Handle

- When using a torque wrench with special service tool or extended handle, if the torque displayed by the wrench reaches the rated figure, it means the actual torque is excessive.
- In this manual, only the torque values that require special notes are described. When using a torque wrench with special service tool or extended handle, calculate the proper torque based on the equation below.



- **Equation: T′ =T×L2/（L1＋L2）**

T′	**Torque reading (N•m)**
T	**Actual torque (N•m)**
L1	**Length of specialized tool or extended handle (mm)**
L2	**Length of torque handle (mm)**

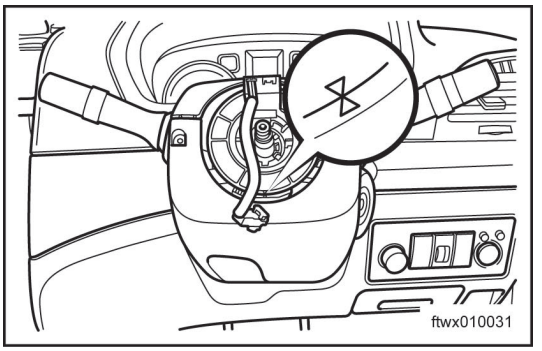
2 . Service Precaution on Model with Supplemental Restraint System

! DANGER

Some vehicles are equipped with Supplemental Restraint System (SRS), i.e., driver airbag. Failure to carry out service operations in the correct sequence may cause the SRS to unexpectedly deploy during servicing, or even lead to critical accident. Furthermore, an operational mistake may also prevent the SRS from normal operations. Before servicing (including removal, installation, inspection or replacement of any part), be sure to read through the following items carefully and perform the correct procedures described in the service manual.

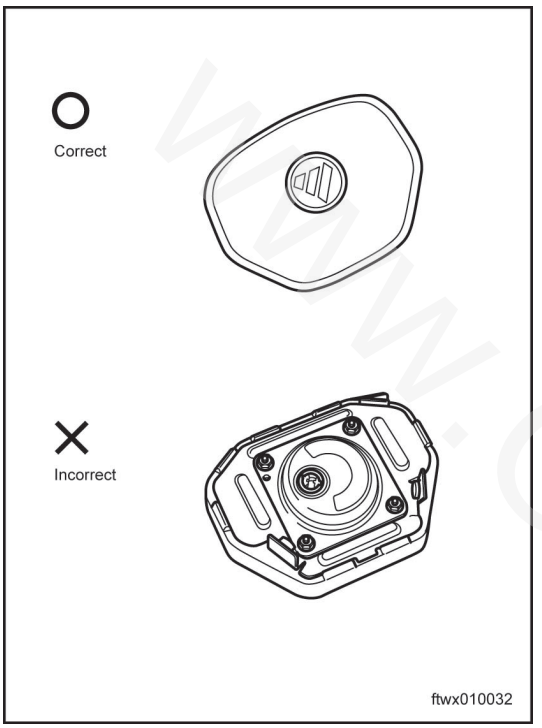
(a) General Precaution

- Since it is difficult to identify the failure of the SRS, Diagnostic Trouble Code (DTC) is an essential source of information during troubleshooting. Thus, when troubleshooting the SRS, always remember to check the DTCs before disconnecting the battery.
- Operation can only be started 90 seconds after the ignition switch is turned to the “LOCK” position and the negative (-) cable and the positive (+) cable are disconnected from the battery. (The SRS is equipped with backup power supply. Therefore, if any operation is taken within 90 seconds after disconnecting the battery negative (-) cable and positive (+) cable, the SRS may deploy suddenly.)
- When the negative (-) cable is disconnected from the battery, the memory of the clock and the radio system will be reset. So before repairing, record all necessary data. At the end of repairing, reset the radio system and the clock. Never use any backup power supply from another vehicle, which may reset the memory of the systems. The backup power supply will power up the SRS, which may unexpectedly deploy the airbag during servicing.
- Even after a minor impact that the SRS does not deploy, it is always important to check the horn button assembly and airbag ECU. (Refer to “Chapter 62. Supplemental restraint system - horn button assembly, replacement”, “Chapter 62. Supplemental restraint system - airbag ECU, replacement”)
- Never use any SRS part from another vehicle. If replacement is required, be sure to use new spare parts.
- Do not disassemble the horn button assembly.
- If the horn button assembly has been dropped, or there are cracks, dents or other faults on the housing, replace it with a new one.
- Do not expose the horn button assembly to heat or flame.
- Use a multimeter with high resistance to troubleshoot the SRS electrical circuits.
- During servicing, be sure to follow the instructions on the labels attached to the SRS components.
- After repairing the SRS, remember to check the airbag indicator lamp. (Refer to “Chapter 04. Diagnosis - airbag system, pre-check”, “Chapter 04: Diagnosis - airbag system, airbag indicator lamp always on”, “Chapter 04. Diagnosis - airbag system, airbag indicator lamp always off”)



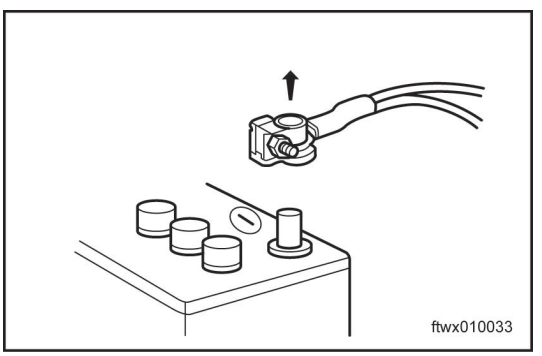
(b) Clock Spring

- Ensure the clock spring is centrally aligned and the steering wheel is correctly installed on the steering column. Otherwise it may lead to loose harness connector or other defect. (Refer to "Chapter 51. Steering system - steering wheel assembly, overhaul", "Chapter 62. Supplemental restraint system - clock spring, replacement")



(c) Horn Button Assembly (with Air Bag)

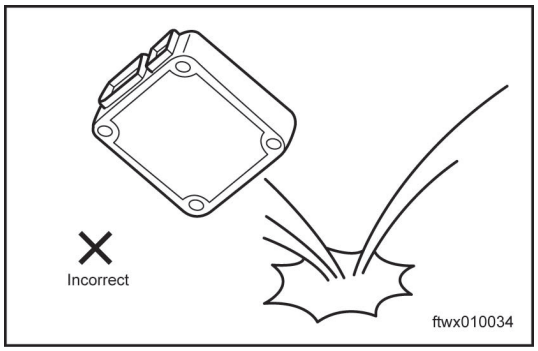
- When storing the horn button assembly, ensure it faces up and don't place anything on the horn button.
- Don't measure the resistance of the air bag trigger unit, or the air bag may suddenly explode and cause danger.
- Don't apply any grease or cleaner onto the horn button.
- Store the horn button assembly in a place with the ambient temperature lower than 93 ℃, moderate humidity and free of electromagnetic intervention.
- Before welding, disconnect the air bag ECU connector.
- Before disposing the prior horn button assembly, explode the air bag with specialized tools in a safe location free of electromagnetic intervention. (Refer to “Chapter 62. Supplemental restraint system - horn button assembly, disposal”)



3 . Electric Control

(a) Connect & Disconnect Negative Battery Cable

- Before any electric service, disconnect the negative battery cable to prevent any incident due to short circuit.
- When disconnecting and connecting the battery cable, turn off the ignition and lighting switch and complete unscrew the cable retaining nuts, without bending or movement.
- Once the negative battery cable is disconnected, the clock and radio records will be reset. So before repairing, record all necessary data.



(b) Work on Electric Components

- Unless particularly necessary, don't open the control module housing (it may be damaged due to static if the IC pins are touched by accident).
- When disconnecting the harness connector, pull the connector instead of the harness.
- Be careful not to drop any electric component, such as sensor or relay. If it is dropped on the hard ground, replace it instead of reusing it.
- When cleaning the engine with steam, prevent the electric components, air filter and other parts in relation to emission control from steam.
- Don't install or remove the thermostat switch or temperature sensor with impact wrench.
- When checking the conduction of the harness connector, carefully insert the probe to prevent the pins from distortion or damage.
- Once an electric component is replaced, check its function and ensure it's functioning.

4 . Removal & Installation of Fuel Control System Parts

(a) Site Precaution

- Work in a place with good ventilation, free of any equipment or object that may create flame, including welding, grinder, electric drill, motor or oven.
- Don't work in or near a gas station, because the vaporized fuel may be all over the place.

(b) Removal & Installation of Fuel System Parts

- Prepare a fire extinguisher before service.
- To prevent static, ground the vehicle and fuel tank and maintain the workshop ground dry, to prevent slipping.
- Don't use motor, working lamp or similar electric unit, to avoid spark or high temperature.
- Don't use an iron hammer to prevent spark.
- Dispose the cloth containing fuel in a nonignitable container.

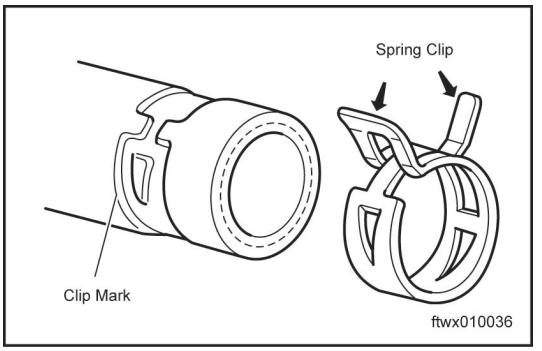
5 . Removal & Installation of Engine Intake System Parts

⚠ **CAUTION**

Any metal fragment in the intake air pipe will seriously damage the engine.

(a) When removing or installing the intake air system parts, close the opening caused by the removed part with clean cloth or tape.

(b) When installing the intake system parts, ensure there is no metal fragment.



6 . Service on Hose Clip

(a) Before removing the hose, check the depth of the connector and the position of the clip, to ensure correct reinstallation.

(b) If any distortion or dent in the hose, replace it.

(c) If the hose is reusable, place the spring clip on the original mark.

(d) For spring clip, after installation, adjust its position by pushing towards the arrow direction.

7 . Catalyst Converter

⚠ **CAUTION**

If plenty of fuel flows into the catalyst converter without combustion, the catalyst converter will be overheated, which may cause fire. In order to prevent such accident, follow the precautions below during service.

(a) Use only unleaded gasoline (for gasoline model).

(b) Don't idle the engine for more than 20 minutes.

(c) Avoid unnecessary sparking test.

- Don't do any sparking test unless necessary. If it is necessary, complete it as soon as possible.
- Don't press the accelerator when doing sparking test.

(d) Don't perform an engine stress test on an ongoing basis. Complete it as soon as possible.

(e) Don't run the engine when the fuel tank is nearly empty, or it may cause extra burden to the catalyst converter when the engine is out of service.

VEHICLE LIFTING & SUPPORTING POSITIONS

1 . When lifting, pay attention to the vehicle condition.

(a) Principle: Lift the vehicle without load. This operation isn't allowed for loaded vehicle.

(b) When removing the engine, transmission or heavier part, the gravity center of the vehicle may change. Place some balance blocks to avoid rollover, or support it with a jack at the specified position.

2 . Precaution on Jack & Lift Use

(a) Work safety according to this manual.

(b) Don't lift the tires with a bar, or it may damage the wheel and tire.

(c) Park the vehicle on flat ground and engage the park brake.

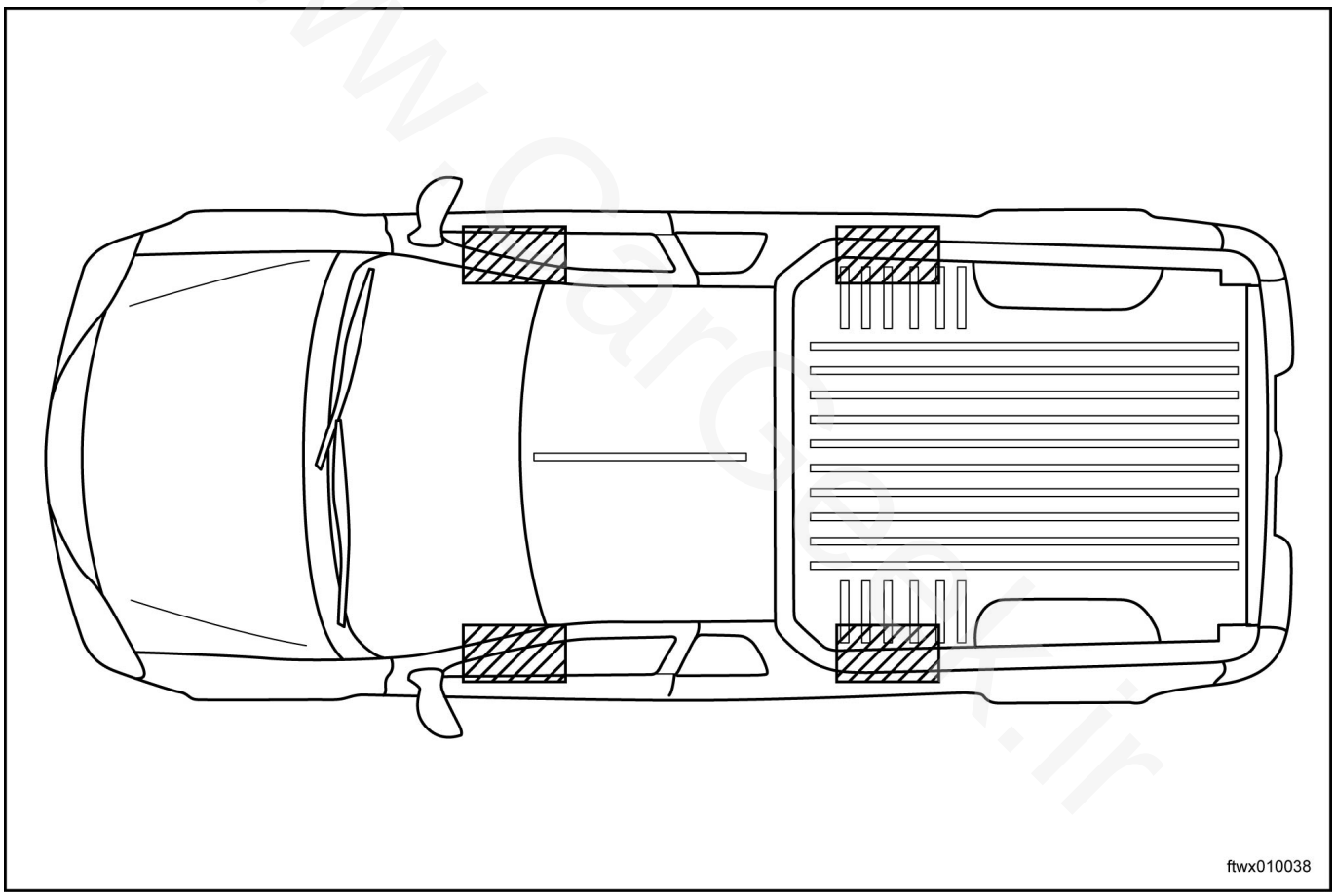
(d) Engage the shift to the reverse gear position.

(e) With stop block, hold the wheel diagonal to the position to lift.

(f) Lift the vehicle with a jack with rubber pad or a lift.

! DANGER

Lift the vehicle at the specified lifting positions.



ftwx010038

01

HOW TO TROUBLESHOOT

OVERVIEW

There are a number of circuits in the model. In general, the troubleshooting of complicated circuit defects requires rich knowledge and skills of the service professinals. However, most of the defects can be identified by checking the circuit one by one. As long as with sufficient understanding and fundamental electric knowledge, the service professional will be able to accurately troubleshoot and fix the system.

Based on the above principles, this manual offers accurate and effective solutions to service professionals.

Please refer to details below on troubleshooting process.

System	Reference
Anti-lock Brake System (ABS)	Chapter 4. Diagnostics - ABS
Air Bag System	Chapter 4. Diagnostics - air bag system
Reverse Sensor System	Chapter 04. Diagnosis - reverse sensor system
Electric Window Control System	Chapter 4. Diagnostics - electric window control system
Electric Rearview Mirror	Chapter 4. Diagnostics - electric rearview mirror
Electric Door Lock Control System	Chapter 4. Diagnostics - electric door lock control system
Engine Control System	Chapter 4. Diagnostics - gasoline engine control system
Wiper & Washer	Chapter 4. Diagnostics - wiper & washer
Rear Windscreen Defrosting System	Chapter 4. Diagnostics - rear windscreen defrosting system
Horn	Chapter 4. Diagnostics - horn
Heating & Air-conditioning	Chapter 4. Diagnostics - heating & air-conditioning
Radio System	Chapter 4. Diagnostics - radio system
Lighting System	Chapter 4. Diagnostics - lighting system
Instrument Panel	Chapter 4. Diagnostics - instrument panel
Combined Display	Chapter 4. Diagnostics - combined display
Body Controller	Chapter 4. Diagnostics - body controller
Tire Pressure Monitoring System	Chapter 4. Diagnostics - tire pressure monitoring system
Transfer Case	Chapter 4. Diagnostics - transfer case
Front Axle Clutch	Chapter 4. Diagnostics - front axle clutch

About Analyzer

1 . Before using the analyzer, carefully review the user's manual.

2 . Connect the analyzer to the dashboard diagnostics harness connector and switch on the ignition. If there is no communication between the analyzer and the control module, it means either the vehicle or the analyzer is defective.

(a) If the analyzer works properly when connected another vehicle, check the dashboard diagnostics harness or the control module power supply.

(b) If no communication when the analyzer is connected to another vehicle, it means the analyzer might be defective. Follow the self-diagnostics procedure in the user's manual.

How to Troubleshoot

⚠ **CAUTION**

- **In this part, we focus on the fundamental processes.**
- **Please troubleshoot subject to the detailed processes listed below.**
- **This manual explains the most effective troubleshooting process for each circuit. (Refer to "Chapter 4. Diagnostics".)**
- **Before any service, review the troubleshooting process of the related circuits.**

1 . Defective Vehicle Delivered

2 . The customer describes the defect.

(a) Inquire the customer about the situation and circumstance when the defect occurred.

3 . Identify symptom and check DTC (with data flow).

(a) Measure the battery voltage.

Voltage: 11~14V (engine off)

(b) Visually check for broken or short circuit in the harness, connector and fuse.

(c) Start the engine and warm it up to normal working temperature.

(d) Identify the symptom and conditions and check DTC.

If any DTC?

Yes > Go to Step 4.

No > Go to Step 5.

4 . Check DTC list.

(a) Check DTC obtained in Step 3, review DTC list and define the system or part inspection process by defective position.

Go to Step 6.

5 . Review defects.

(a) Check the exact symptom obtained in Step 3, review the defect list and define the system or part inspection process by potential positions.

6 . Check the Circuit & Part

(a) Check the system circuit or part identified in Steps 4 & 5, as the potential cause of the defect.

(b) Confirm the defective circuit or part.

7 . Repair

(a) Adjust, repair or replace the defective circuit or part.

8 . Verification

(a) After repair, confirm the defect is eliminated.

(b) If the defect doesn't reoccur, it is also important to simulate the vehicle condition and circumstance at the first occurrence for verification.

9 . Done

The customer describes the defect.

⚠ CAUTION

- **During troubleshooting, don't be judgmental. Accurately analyze the situation and identify the symptom.**
- **It is important to inquire the customer about the situation and circumstance when the defect occurred.**
- **Some seemingly experiences of defect or repair may also help the troubleshooting. Therefore, collecting as much information related to symptom as possible will faciliate the process.**
- **To accurately identify the symptom, pay close attention to the following 5 items in the customer's description on the defect.**

What?	Model No., system name
When?	Date, time, frequency
Where?	Road condition
Under what situation?	Conditions of operation, driving, weather
How?	Symptom

Identify symptom and check DTC (with data flow).

⚠ CAUTION

The analyzer system has a numbere of functions.

(1) The first function is Diagnostics Troubleshooting Code (DTC) check. The defect signal of the control model circuit is stored in the RAM by code. The service professional may review prior DTC during the operation.

(2) Another function is the input check. Check whether the signals from different switches are properly sent to the control module.

These functions help to quickly narrow down the scope and improve the efficiency.

System	System De-scription	DTC	Signal Check (Sensor)	Data Flow	Diagnostics
Anti-lock Brake System (ABS)	—	O	O	O	O
Engine Control System	O	O	O	O	O
Body Control System	O	O	O	O	O
Supplemental Restraint System (SRS)	—	—	—	—	O
Reverse Sensor System	—	—	—	—	O
Electric Window Control System	—	—	—	—	O
Electric Rearview Mirror	—	—	—	—	O

System	System Description	DTC	Signal Check (Sensor)	Data Flow	Diagnostics
Electric Door Lock Control System	—	—	—	—	O
Wiper & Washer	—	—	—	—	O
Rear Windscreen Defrosting System	—	—	—	—	O
Horn	—	—	—	—	O
Heating & Air-conditioning	—	—	—	—	O
Radio System	—	—	—	—	O
Lighting System	—	—	—	—	O
Instrument Panel	—	—	—	—	O
Combined Display	—	—	—	—	O
Tire Pressure Monitoring System	—	—	—	—	O
Transfer Case	—	—	—	—	O
Front Axle Clutch	—	—	—	—	O

(1) During DTC check, it is critical to identify whethe the defect remains or it occurred once and now comes back to normal. In addition, when identifying the symptom, check whether the defect displayed by DTC and the actual symptom is directly related. Therefore, perform DTC check both before and after identifying the symptom, in order to understand the current vehicle condition. Otherwise, it may lead to unnecessary diagnostics and troubleshooting on normal system, which increases the difficulty of troubleshooting or causes unrelated operations. Thus, it is essential to perform DTC check as required.

(2) THe process to use DTC check for troubleshooting, as illustrated below. The process demonostrates how to efficiencly use DTC check. Finally, it also illustrates how to troubleshoot with DTC and defect list.

1 . DTC Check

2 . Record the displayed DTC and then erase it.

⚠ **CAUTION**

If DTC appears in the first check, it means there was defect in the circuit harness or connector. Check the related harness or connector. (Refer to "Chapter 1. Introduction - how to troubleshoot, electric test procedure")

3 . Identify the Symptom

Does the symptom remain?

Yes > Go to Step 4.

No > Go to Step 5.

4 . Simultaneous Symptom Test (Refer to "Chapter 1. Introduction - how to troubleshoot, how to troubleshot")

5 . DTC Check Again

If any DTC?

Yes > Troubleshoot the defect displayed by DTC.

No > System in normal condition.

6 . Identify the Symptom

Does the symptom exist?

Yes > Go to Step 7.

No > System in normal condition.

7 . Troubleshoot by Defect List

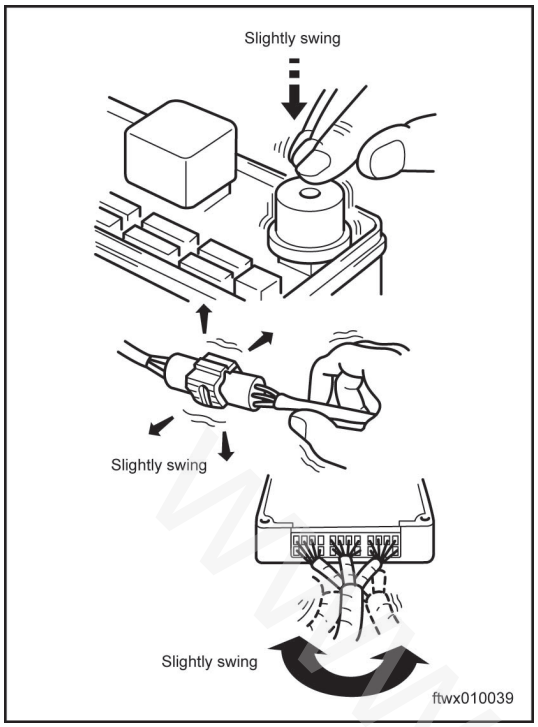
The exact defect exceeds the scope of the diagnostics system (the prior DTC refers to former defect or is not the key point).

8 . Done

Simultaneous Symptom Test

⚠ **CAUTION**

- **For troubleshooting, the most difficult situation is no symptom at all. In such case, it is important to thoroughly analyze the defect described by the customer and simulate the vehicle and circumstance upon the defect. Regardless of experience and skill, if a service professional fails to verify the symptom during troubleshooting, he may ignore some important messages and make the wrong guess, which leads to ineffectiveness.**
- **For example, the defects occurred at cool state or due to bumpy road in driving can never be identified when the engine is hot or the vehicle is parked. Since vibration, heat and water leakage (humidity) are frequent causes of defects, which are hard to reduplicate, simultaneous symptom test is introduced, which effectively simulates the circumstance for diagnostics when the vehicle is parked.**
- **Key points of simultaneous symptom test: (1) First of all, confirm the symptom and identify the position or part of the defect. To do this, before the simulation, connect the analyzer first and narrow down the troubleshooting scope depending on the symptom. (2) Perform the simulation symptom test, determine whether the tested circuit is broken or working, and also verify the symptom. Refere to the system defect lists and narrow down the scope of possible causes.**



1 . Swinging - for defects potentially caused by vibration.

(a) Part and sensor.

- Slightly swing the potentially defective sensor with your finger and notice the defect.

⚠ CAUTION

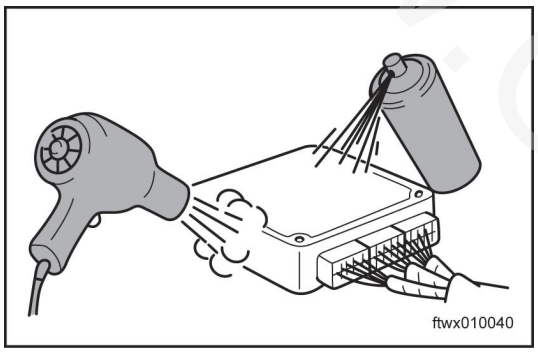
If too much force is imposed, it may break the relay circuit.

(b) Connector.

- Slightly swing the connector vertically and horizontally.

(c) Harness.

- Slightly swing the harness vertically and horizontally. Carefully check the connection between the harness and the connector.

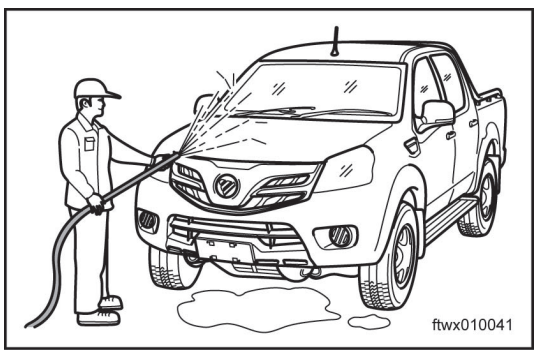


2 . Heating - for any defect caused by partial heat.

(a) Heat the potentially defective part with a hair dryer or equivalent and notice the defect.

⚠ CAUTION

- **Don't allow the temperature exceeding 60 ℃, or it may damage the part.**
- **Don't directly heat the parts inside the control module.**



3 . Raining - for any defect potentially caused by rain or high humidity.

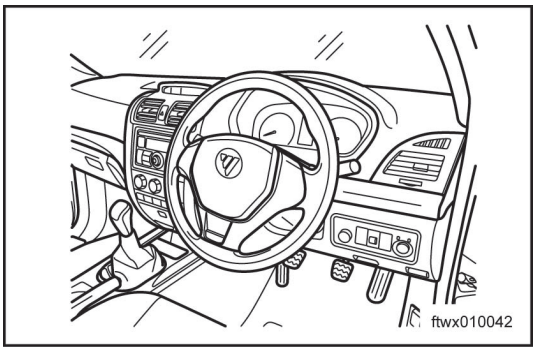
(a) Spray water onto the vehicle and notice the defect.

⚠ CAUTION

- **Don't directly spray water onto the engine hood. Spray water onto the radiator, which will indirectly change the engine temperature and humidity.**
- **Don't spray water directly onto the electic components.**

⚠ CAUTION

If any leakage, the fluid may contaminate the control module. Pay attention to it during the raining test.



4 . High electric load - for any defect potentially caused by high electric load.

(a) Switch on all consumers, including A/C, headlight and rear windscreen heating and notice the defect.

DTC List

Take the DTC list of the engine control system as an example, as shown in the table below.

The table shows DTCs and corresponding test procedures. Troubleshooting by the table will substantially improve your efficiency and accuracy.

DTC List

Attention

When performing DTC check in check mode, if a certain DTC appears, checkthe circuit by the code listed below. Refer to corresponding pages for DTC details.

Diagnostic Trouble Code | Implication | Potentially Defective Circuit or Part

Trouble Code	Item to Diagnose (DTC Definition)	Defective Part
P0106	Rational Defect in Intake Pressure/Accelerator Position Signal	• Intake Manifold Pressure Sensor • Poor contact of intake manifold pressure sensor connector; broken or short circuit in sensor harness • ECM
P0107	Low Voltage or Broken Circuit of Intake Pressure Sensor	• Intake Manifold Pressure Sensor • Poor contact of intake manifold pressure sensor connector; broken or short circuit in sensor harness • ECM
P0108	High Voltage of Intake Pressure Sensor	• Intake Manifold Pressure Sensor • Poor contact of intake manifold pressure sensor connector; broken or short circuit in sensor harness • ECM
P0 1 1 2	or	• take temperature sensor • Poor contact of intake manifold temperature sensor connector; broken or short circuit in sensor harness • ECM

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Defects

Defects deliver the possible causes (such as circuit or part) of each defect as follows. When the analyzer displays that the system is working properly, yet the defect remains, troubleshoot by the defect list. The number in the table refers to the sequence of circuit or part check.

If the vehicle diagnostics system cannot find the defect, while the symptom actually exists, it means the defect exceeds the scope of the system.

Defects

Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in the order and replace the part if necessary.

Symptom	Suspect Area	Reference
Front wiper not functioning	1 . Fuse	-
	2 . Wiper & washer switch	Chapter 51. Steering system - combined switch assembly, replacement
	3 . Wiper motor	Chapter 65. Wiper & washer - wiper motor, replacement
	4 . Harness	-
Front wiper not functioning at low speed	1 . Wiper motor	Chapter 65. Wiper & washer - wiper motor, replacement
	2 . Wiper & washer switch	Chapter 51. Steering system - combined switch assembly, replacement
	3 . Harness	-
Front wiper not functioning at low speed	1 . Wiper motor	Chapter 65. Wiper & washer - wiper motor, replacement
	2 . Wiper & washer switch	Chapter 51. Steering system - combined switch assembly, replacement
	Harness	-
		Chapter 65. Wiper & washer replacement

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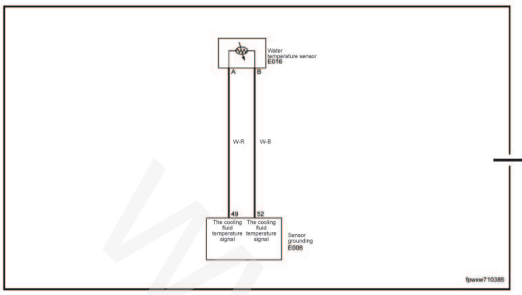
ELECTRIC TEST PROCEDURE

How to read and use the Electric Test section in this manual as the table below.

P0118 – High voltage of coolant temperature sensor circuit — Diagnostics Code/Symptom

Circuit Diagram



Diagnostics Circuit Diagram (Color Coded)

Diagnostics Process

1. Read the DTC and data from analyzer
   1) Start engine until it reaches normal working temperature
   2) Execute DTC verification process with analyzer
   3) Execute sensor data flow reading process
   4) Read coolant temperature (ECT) sensor data on analyzer

Diagnostics Process & Evidence

Displayed DTC & Value	Go to	Status
• P0118 • Approx. – 40°C	Next step	Open circuit or short circuit of power supply
• P0117 • Approx. 140°C or higher	Step 5	Short to ground
• P0117 or P0118 • 80°C-100°C	Diagnosis help	Intermittent defect

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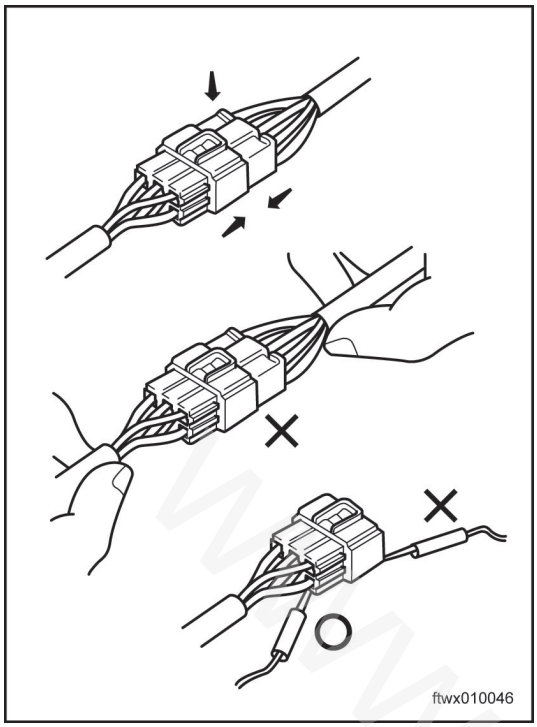
1 . Basic Check

(a) Resistance Measuring Conditions on Electric Components

- All resistance measurements are under the ambient temperature of 20℃ unless otherwise indicated.
- A running vehicle increases the temperature, under which the measured resistance may exceed the specified range. Therefore, perform the resistance measurement after the engine cools down.

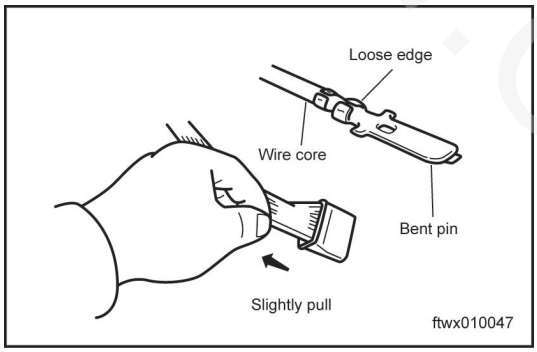


(b) Precaution on Connector Operation

- When removing a connector with buckle, slightly press the connector along the interface, gently press the clip and open the buckle.
- When removing the connector, hold it without stretching the harness.
- When connecting the connector, check for distortion, damage or missing pin in the connector.
- When connecting the connector with buckle, ensure you hear the click, which means it is firmly secured.
- When checking the connector with multimeter, use mini probe at the back of the connector (one side of the harness).

⚠ **CAUTION**

- **Since no back check is available to waterproof connector, check it after connecting a supplementary harness.**
- **When moving the probe, be careful not to damage the connector pin. Key Points on Connector Check**



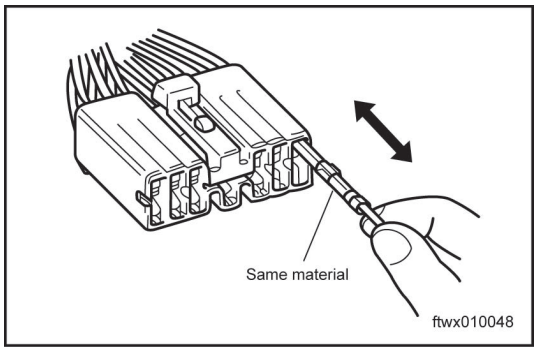
(c) Key Points on Connector Check

When connecting the connector, check:

- Hold the connector. Check the inserting and locking situations (connected).

When disconnecting the connector, check:

- Gently pull the harness and check for missing or bent pin or broken central harness.
- Visually check for rust, metal fragment, water and bent or rusty pin, impurities or distortion in the connector.

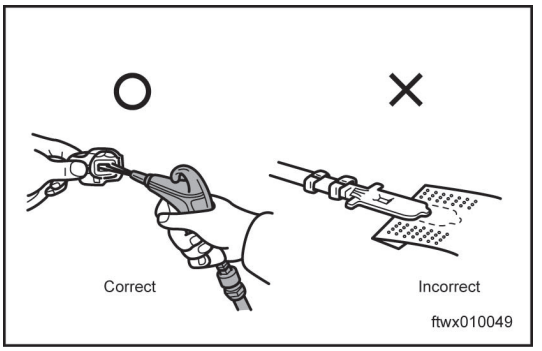


Check the contact pressure at the pin:

- **Prepare a male connector and insert it into the female connector, to check the connection and sliding resistance.**

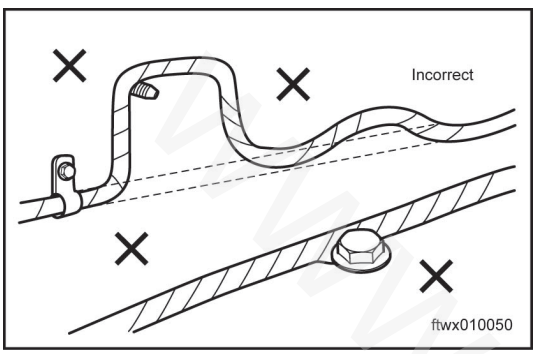
⚠ **CAUTION**

Use gold-plated male connector to check gold-plated female connector.



(d) Service at Connector Pin

- If any dirt or oil, clean the contact point with air gun or cloth. Don't polish with sand paper, or it may damage the plated layer.
- If the contact pressure is abnormal, replace the female connector. In such case, if the male connector is gold plated, use a female gold-plated connector. And if the male connector is silver plated, use a female connector in the same material.

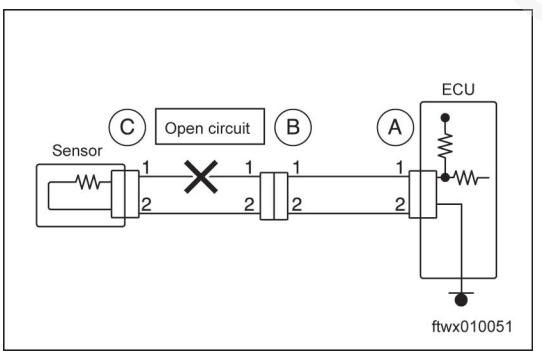


(e) Service Precaution on Harness

- Before removing the harness, check the positions of the harness and the band, to faciliate reinstallation.
- Don't excessively twist, pull or hang the harness.
- Keep the harness away from hot, rotating, moving, vibrating or sharp (such as panel edge or screw point) parts.
- When installing the parts, don't clamp or catch the harness.
- Don't cut or break the harness insulation. In case of breakage, replace the harness or wrap the broken part with insulation tape.

2 . Check for Broken Circuit

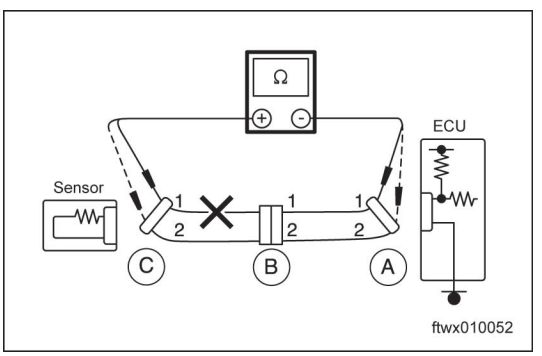
(a) See the circuit diagram as illustrated at the left. Perform conduction test and voltage test in Step 2 and 3 respectively, to identify the position of broken circuit.



(b) Conduction Test

- Disconnect the connectors A and C and measure the resistance in between.

Resistance: < 2 Ω



⚠ CAUTION

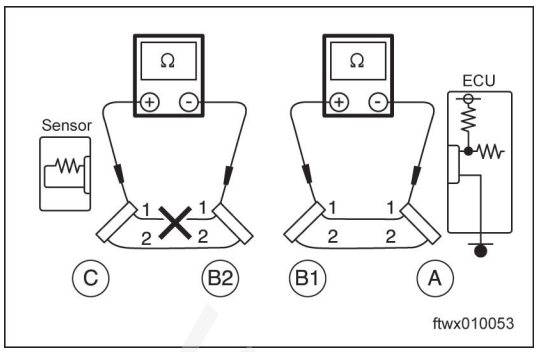
Slightly swing the harness horizontally and vertically, and measure the resistance.

Take this circuit for an example.

If the resistance between Pin 1 of Connectors A and C: ⩾ 1 MΩ

And the resistance between Pin 2 of Connectors A and C: < 2 MΩ

It means the circuit is broken between Pin 1 of Connectors A and C.



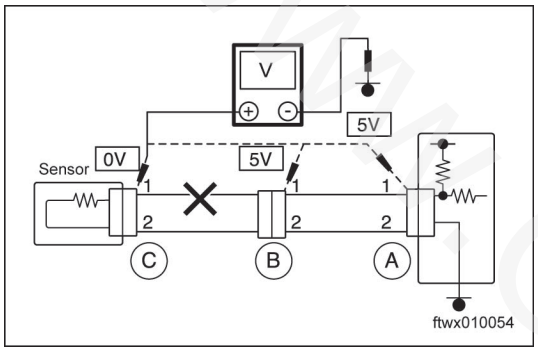
- **Disconnect Connector B and measure the resistance between the connectors.**

Take this circuit for an example.

And the resistance between Pin 1 of Connectors A and B1: < 2 Ω

And the resistance between Pin 1 of Connectors B2 and C: ⩾ 1 MΩ

It means the circuit is broken between Pin 1 of Connectors B2 and C.



(c) Voltage Test

- When the circuit is energized, check for broken circuit by means of voltage test.
- Take the circuit as an example. All the connectors are connected. Measure the voltage between Pin 1 of Connector A, Pin 1 of Connector B, Pin 1 of Connector C at the 5V output of the control module and the grounding in sequence.

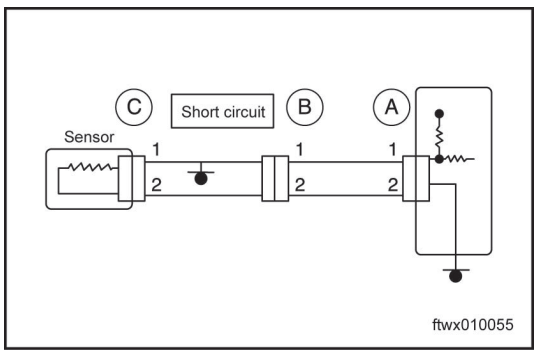
If the following results are achieved:

Voltage between Pin 1 of Connector A and grounding: 5V

Voltage between Pin 1 of Connector B and grounding: 5V

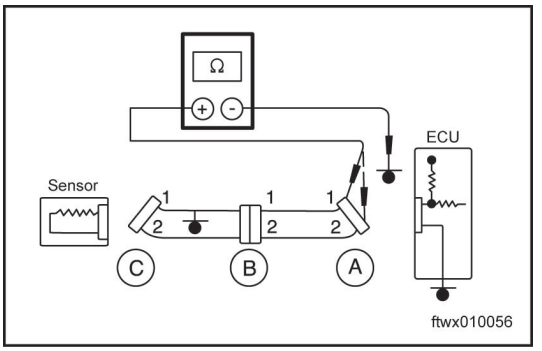
Voltage between Pin 1 of Connector C and grounding: 0 V

It means the circuit is broken between Pin 1 of Connectors B and C.



3 . Check for Short Circuit

(a) As illustrated at the left, there is short circuit between the harness and the grounding. Perform conduction test between it and the grounding in Step 2, to identify the short position.



(b) Conduction Test

- Disconnect Connectors A and B and measure the resistance between Pins 1 & 2 of Connector A and the grounding.

  Resistance: ⩾ 1 MΩ

⚠ CAUTION

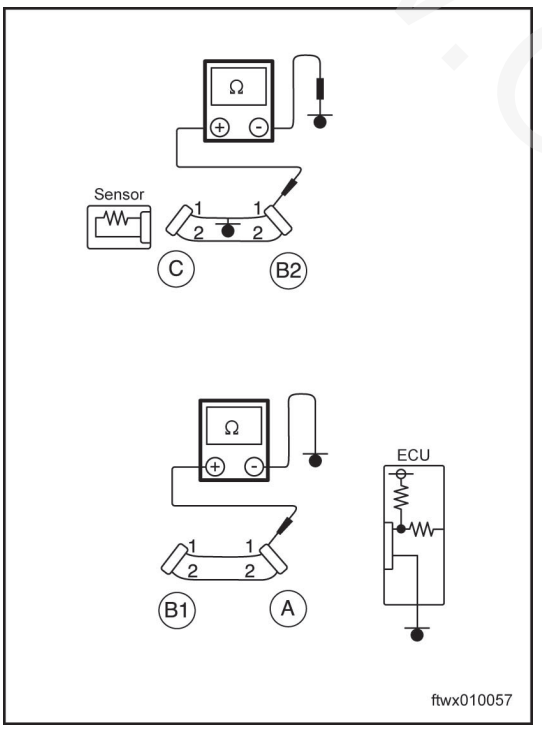
Slightly swing the harness horizontally and vertically, and measure the resistance.

Take this circuit for an example.

If the resistance between Pin 1 of Connector A and grounding: < 2 Ω

And the resistance between Pin 2 of Connector A and grounding: ⩾ 1 MΩ

It means the circuit is broken between Pin 1 of Connectors A and C.



- **Disconnect Connector B and measure the resistance between Pin 1 of Connectors A and B2 and the grounding.**

Take this circuit for an example.

And the resistance between Pin 1 of Connector A and grounding: ⩾ 1 MΩ

And the resistance between Pin 1 of Connector B2 and grounding: < 2 Ω

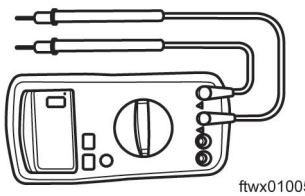
It means there is short circuit between Pin 1 of Connectors B2 and C.

PREPARATION

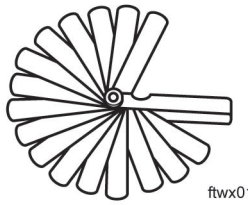
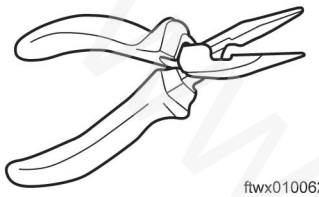
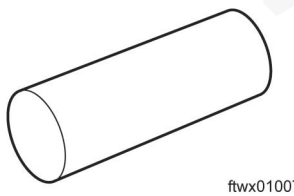
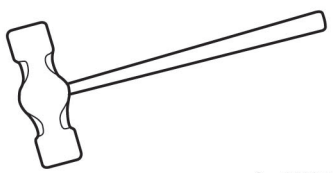
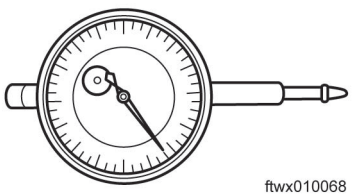
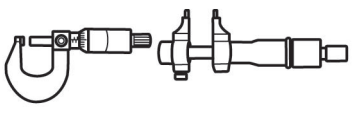
SEAT BELT

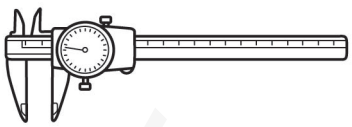
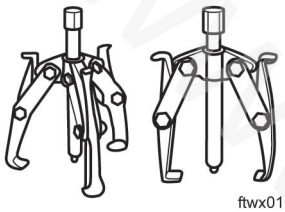
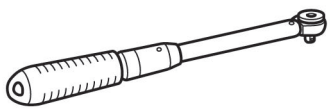
PREPARATION

Recommended Tools

 ftwx010059	Digital Multimeter	Electrical Buckle Assembly
 ftwx010061	Torque Wrench	

TRANSMISSION
PREPARATION
02
Recommended Tools

 ftwx010072	Feeler Gauge	Synchronizer Intermediate Shaft Spacer
 ftwx010062	Needle Nose Pliers	Return Spring
 ftwx010079	Cooper Rod	Reverse idler shaft
 ftwx010075	Hammer	Reverse idler shaft
 ftwx010068	Dial Indicator	
 ftwx010069	Micrometer	

 ftwx010070	Circlip Pliers	
 ftwx010071	Vernier Calipers	Shifting Fork Synchronizer
 ftwx010076	Puller	Bearing
 ftwx010061	Torque Wrench	

Equipments

V Bench	
Table Vice	

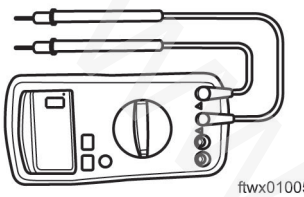
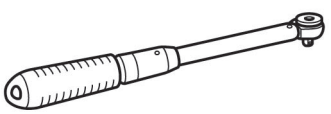
Supplies

Item	Usage	Specification
Transmission Oil	2.0L	GL-5 75W/90
		GL-5 80W/90
		GL-5 85W/90
Lubricant		Mitsubishi No.0101011
Sealant		Mitsubishi No.997740
Adhesive		3M No.4170

VEHICLE CONTROL SYSTEM

PREPARATION

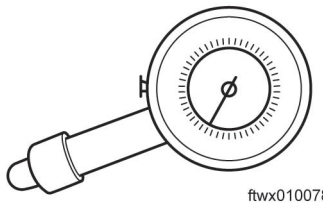
Recommended Tools

 ftwx010058	KT600 Integrated Diagnostic Unit	
 ftwx010059	Digital Multimeter	
 ftwx010061	Torque Wrench	

WHEEL & TIRE

PREPARATION

Recommended Tools

 ftwx010078	Tire Pressure Gauge	Wheel & Tire
 ftwx010061	Torque Wrench	

Equipments

Dynamic Balancer	
Tire Changer	
Tire Inflator	

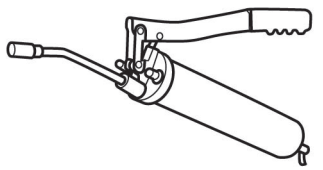
Supplies

Item	Usage	Specification
Balance Block		

DOOR & ENGINE HOOD

PREPARATION

Recommended Tools

 ftwx010080	Grease Gun	Door
 ftwx010061	Torque Wrench	

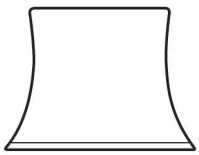
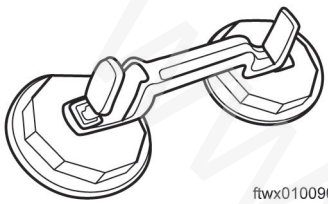
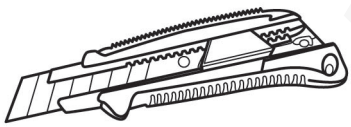
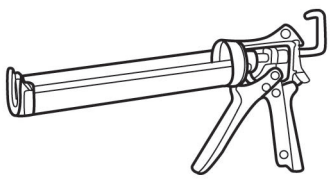
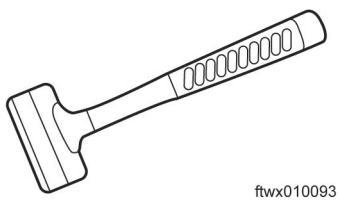
Supplies

Item	Usage	Specification
Grease		

WINDSCREEN, WINDOW & BACKVIEW MIRROR

PREPARATION

Recommended Tools

 ftwx010089	Plastic Spatula	Windscreen Rear Windscreen
 ftwx010090	Glass Sucker	Windscreen Rear Windscreen
 ftwx010091	Utility Knife	Windscreen Rear Windscreen
 ftwx010092	Silicon Gun	Windscreen Rear Windscreen
 ftwx010093	Rubber Hammer	Windscreen Rear Windscreen

Supplies

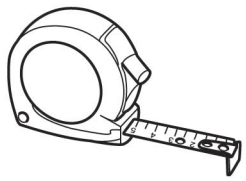
Item	Usage	Specification
Protective Strap		
Wooden Block		
Plastic Sheet		
Fine Wire		
Nylon String		

Item	Usage	Specification
Tape		
Primer		Reactive Polyester Primer in Black
Glass Sealant		Polyurethane Sealant in Black

POWER STEERING

PREPARATION

Recommended Tools

 ftwx010082	Tape Measure	Driving Wandering
 ftwx010061	Torque Wrench	

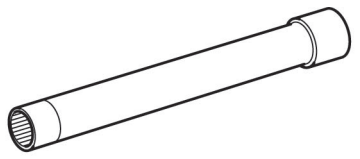
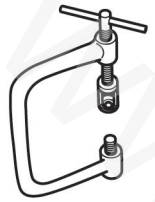
Supplies

Item	Usage	Specification
Steering Fluid	0.4L	ATF-III
Steering Lubricant		QL-5 80W/90
Sealant for Hydraulic Return Pipe		

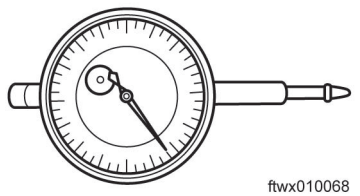
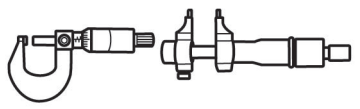
ENGINE MECHANICAL SYSTEM

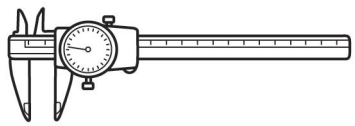
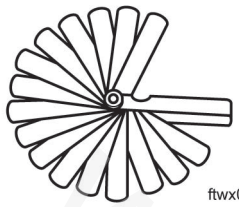
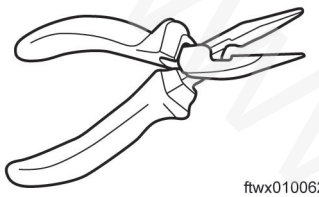
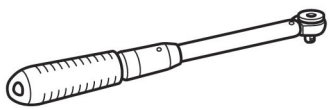
PREPARATION

Special Tools

 ftwx010066	Cylinder Head Bolt Remover	Cylinder Head Bolt
 ftwx010067	Valve Spring Compressor	To remove valve and related components

Recommended Tools

 ftwx010068	Dial Indicator	Crankshaft
 ftwx010069	Micrometer	Piston
 ftwx010070	Circlip Pliers	Piston Pin
 ftwx010063	Hydraulic Jack Vernier Calipers	Engine

 ftwx010071	Vernier Calipers	Camshaft
 ftwx010072	Feeler Gauge	Crankshaft
 ftwx010062	Needle Nose Pliers	Water Pipe Clip
 ftwx010061	Torque Wrench	

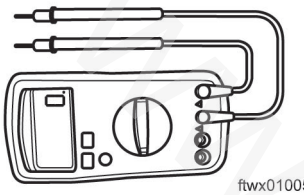
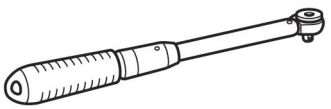
Supplies

Item	Usage	Specification
Sealant		Foton-authorized Sealant
Coolant	10.0L	Foton-authorized Coolant
Engine Oil	4.0L	SAE 0W-30
		SAE 5W-30
		SAE 5W-40

ENGINE CONTROL SYSTEM

PREPARATION

Recommended Tools

 ftwx010058	KT600 Integrated Diagnostic Unit	Fuel Injection System Ignition System sensor Actuator
 ftwx010059	Digital Multimeter	sensor Actuator ECM
 ftwx010060	Test Cable Set	sensor Actuator ECM
 ftwx010061	Torque Wrench	

Equipments

Oscillograph	Read the wave form of sensor
Fuel pressure gauge	Check the fuel pressure.

Supplies

Item	Usage	Specification
Threaded Seal		3M NO.4171 or equivalent

SUPPLEMENTAL RESTRAINT SYSTEM

PREPARATION

Recommended Tools

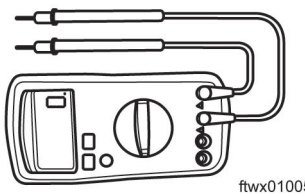
 ftwx010083	Hexagon Wrench	Horn Button Assembly
 ftwx010061	Torque Wrench	

WIPER & WASHER

PREPARATION

02

Recommended Tools

 ftwx010059	Digital Multimeter	
 ftwx010061	Torque Wrench	

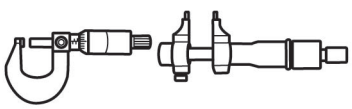
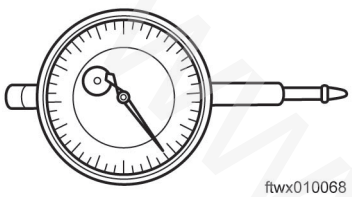
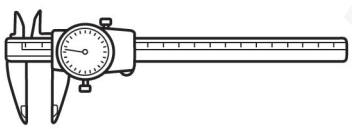
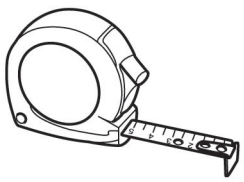
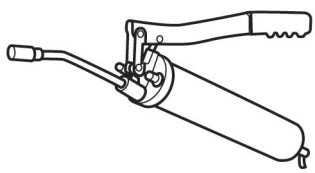
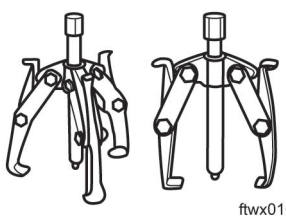
Equipments

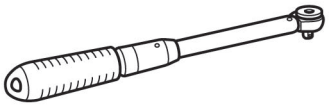
Oscillograph	

BRAKE

PREPARATION

Recommended Tools

 ftwx010069	Micrometer	Brake Disc
 ftwx010068	Dial Indicator	Brake Disc
 ftwx010071	Vernier Calipers	Rear Brake Drum Rear Brake Shoe
 ftwx010082	Tape Measure	Brake Lining
 ftwx010080	Grease Gun	Front Rim Rear Rim
 ftwx010076	Puller	Front Rim Rear Rim Front Rim Oil Seal Rear Rim Oil Seal Half Axle

 ftwx010061	Torque Wrench	Thermostat

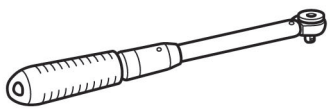
Supplies

Item	Usage	Specification
Braking Fluid	1.0L	7104-1(D0T4)

REAR SUSPENSION

PREPARATION

Recommended Tools

 ftwx010061	Torque wrench (20 – 120N•m)	

Equipments

Wheel Alignment		
Tire Changer		
Wheel Dynamic Balancer		

Supplies

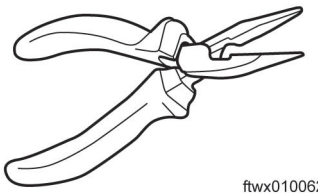
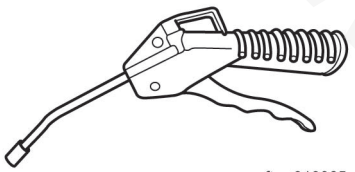
Item	Usage	Specification
Grease		

INTAKE

PREPARATION

02

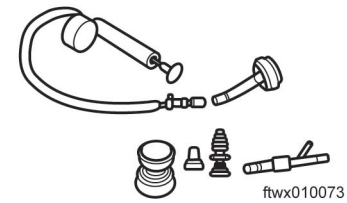
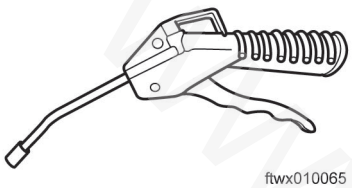
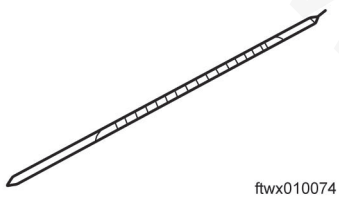
Recommended Tools

 ftwx010062	Needle Nose Pliers	
 ftwx010085	Gas Leakage Sensor	
 ftwx010065	High Pressure Air Gun	

COOLING

PREPARATION

Recommended Tools

 ftwx010073	Radiator Cover Tester	Water Tank
 ftwx010065	High Pressure Air Gun	Water Tank
 ftwx010074	Thermometer	Thermostat

Equipments

Steam Cleaner	

Supplies

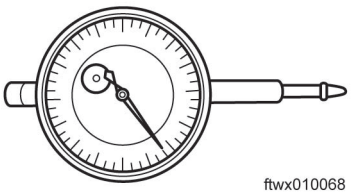
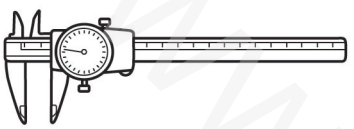
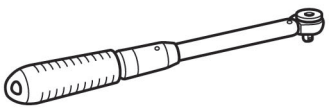
Item	Usage	Specification
Sealant		Foton-authorized Sealant
Coolant (Gas engine)	6.5L	Foton-authorized Coolant
Coolant (Diesel engine)	8 – 9L	Foton-authorized Coolant

CLUTCH

PREPARATION

02

Recommended Tools

 ftwx010068	Dial Indicator	Lining
 ftwx010071	Vernier Calipers	Lining
 ftwx010070	Circlip Pliers	Clutch Pump
 ftwx010061	Torque Wrench	-

Equipments

Table Vice	

Supplies

Item	Usage	Specification
Braking Fluid	1L	DOT3
Grease		Mitsubishi No.0101011

DOOR LOCK

PREPARATION

Recommended Tools

 ftwx010070	Circlip Pliers	Lock Cylinder

Supplies

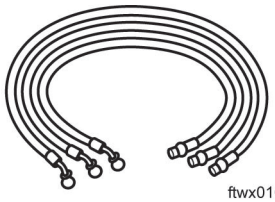
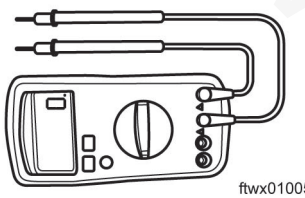
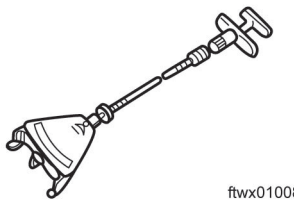
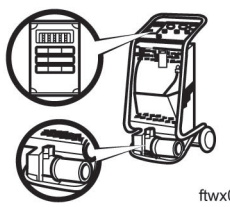
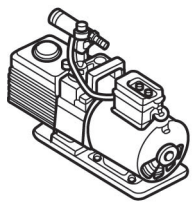
Item	Usage	Specification
Grease		

HEATING & AIR-CONDITIONING

PREPARATION

02

Recommended Tools

 ftwx010084	Rubber Tube for Refrigerant Topping	Add refrigerant.
 ftwx010085	Gas Leakage Sensor	Check refrigerant leakage
 ftwx010059	Digital Multimeter	Heating & Air-conditioning Control System
 ftwx010086	Belt Tension Gauge	Check compressor belt tension
 ftwx010087	Refrigerant Topping & Recycling Unit (No Vacuum Pump is Needed with This Unit)	Fill and collect the refrigerant Repair compressor assembly
 ftwx010088	Vacuum Pump	Fill up the Refrigerant Repair compressor assembly

Equipments

Steam Cleaner	Clean A/C pipeline

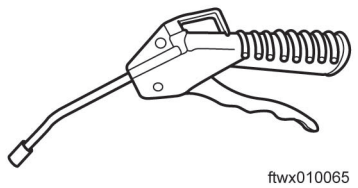
Supplies

Item	Usage	Specification
Refrigerant	700 ± 50g	R134a

EMISSION CONTROL

PREPARATION

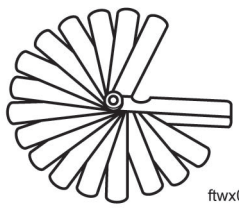
Recommended Tools

 ftwx010065	High Pressure Air Gun	Carbon Canister Canister Solenoid Valve Positive Crankcase Ventilation Valve

EXHAUST

PREPARATION

Recommended Tools

 ftwx010072	Feeler Gauge	Exhaust Manifold
 ftwx010061	Torque Wrench	

Supplies

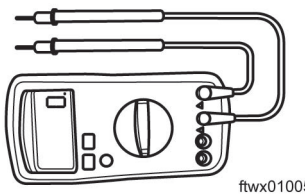
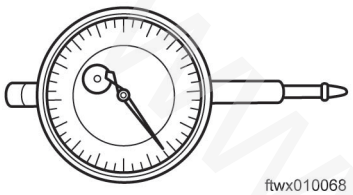
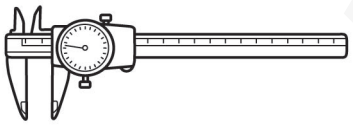
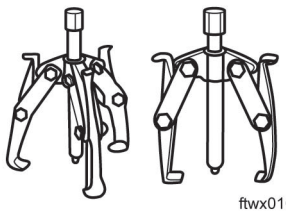
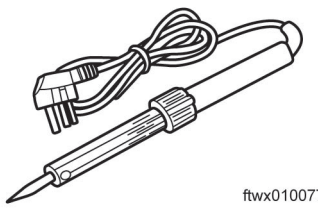
Item	Usage	Specification
Exhaust Pipe Sealant		Foton-authorized Exhaust Pipe Sealant

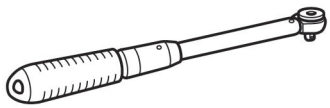
START & CHARGE

PREPARATION

02

Recommended Tools

 ftwx010059	Digital Multimeter	Alternator
 ftwx010068	Dial Indicator	Alternator Starter
 ftwx010071	Vernier Calipers	Starter
 ftwx010076	Puller	Starter
 ftwx010077	Electric Iron	Alternator
 ftwx010070	Circlip Pliers	Starter

 ftwx010061	Torque Wrench	

Equipments

Battery Recharger	

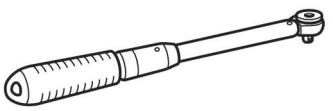
Supplies

Item	Usage	Specification
Grease		

FRONT SUSPENSION

PREPARATION

Recommended Tools

 ftwx010061	Torque Wrench	

Equipments

Wheel Alignment		
Tire Changer		
Wheel Dynamic Balancer		

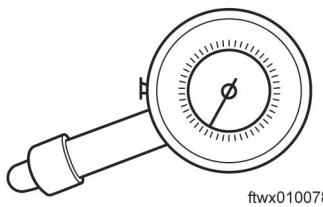
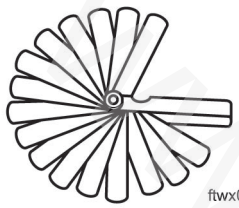
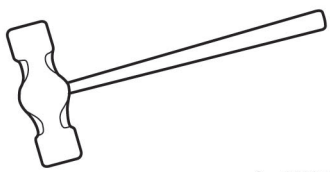
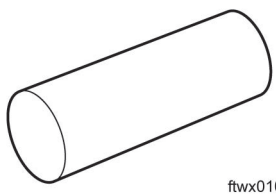
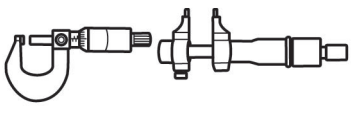
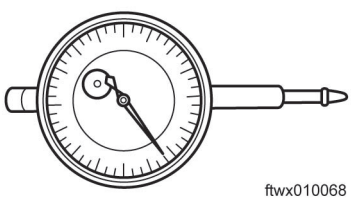
Supplies

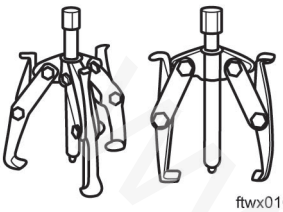
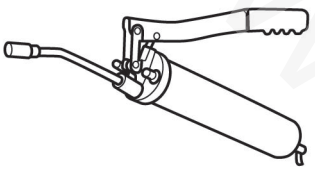
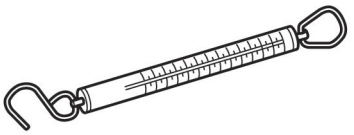
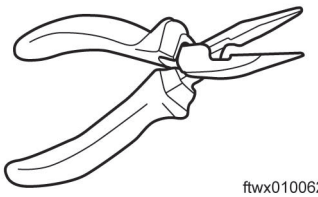
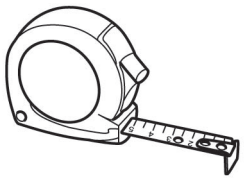
Item	Usage	Specification
Lithium base grease	Add (1.8±0.1)g to the sliding part of the column connecting rod	

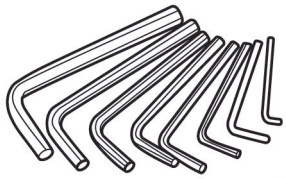
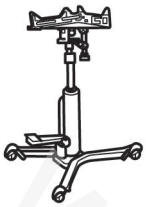
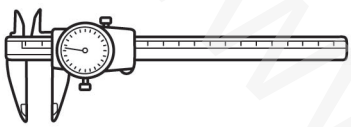
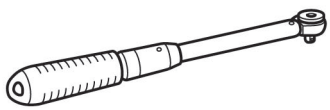
AXLE & TRANSMISSION SHAFT

PREPARATION

Recommended Tools

 ftwx010078	Tire Pressure Gauge	Tire
 ftwx010072	Feeler Gauge	Transmission Shaft Spline Half Axle Gear
 ftwx010075	Hammer	Transmission Shaft Cardin Joint Intermediate Bearing Front Wheel Trim Rear Wheel Trim Rear Wheel Bearing Cardin Joint Differential Planetary Gear Shaft
 ftwx010079	Cooper Rod	Transmission Shaft Cardin Joint Intermediate Bearing Front Wheel Trim Rear Wheel Trim Rear Wheel Bearing Cardin Joint Differential Planetary Gear Shaft
 ftwx010069	Micrometer	Transmission Shaft Cardin Joint Cross Shaft
 ftwx010068	Dial Indicator	Transmission Shaft Cardin Joint Front Wheel Bearing Rear Wheel Bearing Drive Gear Passive Wheel Half Axle Gear

		Planetary Gear Drive Gear Flange
 ftwx010070	Circlip Pliers	Transmission Shaft Cardin Joint Rear Wheel Bearing Main Reducer Output Flange
 ftwx010076	Puller	Transmission Shaft Yoke
 ftwx010080	Grease Gun	Front Wheel Bearing Rear Wheel Bearing Cardin Joint
 ftwx010081	Spring Balance	Front Wheel Turning Force Rear Wheel Turning Force
 ftwx010062	Needle Nose Pliers	Split Pin Intermediate Bearing Oil Seal Main Reducer Output Flange Oil Seal Drive Gear Oil Seal
 ftwx010082	Tape Measure	Rear Axle Windage

 ftwx010083	Hexagon Wrench	Main Reducer Oil Filler Plug Main Reducer Oil Drain Plug
 ftwx010063	Hydraulic Jack	Main Reducer Assembly
 ftwx010071	Vernier Calipers	Half Axle Gear Thrust Washer Planetary Gear Thrust Washer Differential Bearing Spacer Drive Gear Spacer
 ftwx010061	Torque Wrench	Drive Gear Starting Torque

Equipments

V Bench	
Transmission Shaft Dynamic Balancer	
Table Vice	
Benchpress	

Supplies

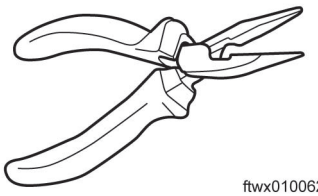
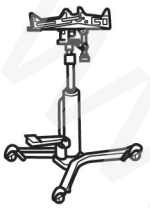
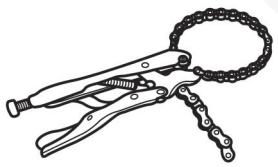
Item	Usage	Specification
Front Main Reducer Gear Oil	1.2L	GL-5 85W/90
Rear Main Reducer Gear Oil	(1.27±0.03)L	GL-5 85W/90
Rear Main Reducer Gear Oil Additive	Approx. 0.06L	Houghton Sturaco 7098
Sealant	Proper amount	Loctite 5699 surface sealant or equivalent

FUEL

PREPARATION

02

Recommended Tools

 ftwx010062	Needle Nose Pliers	Fuel Pressure Regulator
 ftwx010063	Pressure Jack	Fuel Tank Assembly
 ftwx010064	Filter Wrench	Fuel Filter Assembly

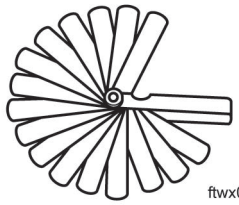
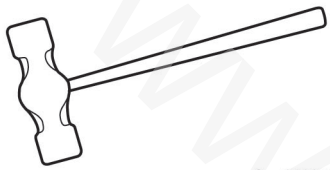
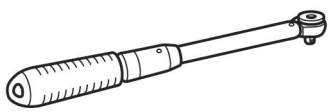
Equipments

Fuel Nozzle Leakage Detector	

LUBRICATION

PREPARATION

Recommended Tools

 ftwx010072	Feeler Gauge	Engine Oil Pump
 ftwx010075	Hammer	Oil Pan
 ftwx010061	Torque Wrench	

Supplies

Item	Usage	Specification
Sealant		Foton-authorized Sealant
Engine Oil	4L	SAE 0W-30
		SAE 5W-30
		SAE 5W-40

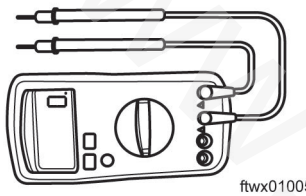
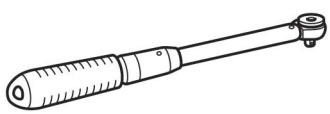
DASHBOARD & INSTRUMENTS

PREPARATION

Recommended Tools

 ftwx010058	KT600 Integrated Diagnostic Unit	Instrument Panel
 ftwx010083	Hexagon Wrench	Horn Button Assembly

DIAGNOSTICS
PREPARATION
Recommended Tools

 ftwx010058	KT600 Integrated Diagnostic Unit	Engine Control System Anti-lock Brake System (ABS) Supplemental Restraint System (SRS)
 ftwx010059	Digital Multimeter	Engine Control System Anti-lock Brake System (ABS) Supplemental Restraint System (SRS) Electric Window Control System Electric Rearview Mirror Electric Door Lock Control System Wiper & Washer Rear Windscreen Defrosting System Heating & Air-conditioning Information System Audio System Lighting System Instrument Panel
 ftwx010060	Test Cable Set	Engine Control System Anti-lock Brake System (ABS) Supplemental Restraint System (SRS) Electric Window Control System Electric Rearview Mirror Electric Door Lock Control System Wiper & Washer Rear Windscreen Defrosting System Heating & Air-conditioning Information System Audio System Lighting System Instrument Panel
 ftwx010061	Torque Wrench	

Equipments

Oscillograph	

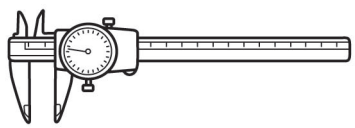
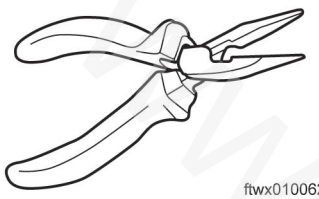
Supplies

Item	Usage	Specification
Thread Sealant		3M NO.4171 or equivalent

PARK BRAKE

PREPARATION

Recommended Tools

 ftwx010071	Vernier Calipers	Rear Brake Drum Rear Brake Shoe
 ftwx010062	Needle Nose Pliers	Front Park Brake Cable Left Rear Park Brake Cable Right Rear Park Brake Cable

Equipments

Table Vice	

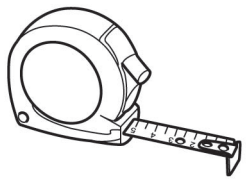
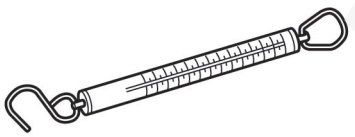
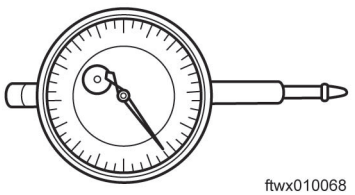
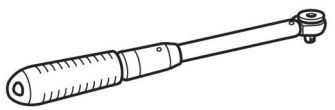
Supplies

Item	Usage	Specification
Braking Fluid	1L	7104－1(D0T4)

STEERING SYSTEM

PREPARATION

Recommended Tools

 ftwx010082	Tape Measure	Driving Wandering
 ftwx010083	Hexagon Wrench	Horn Button Assembly
 ftwx010081	Spring Balance	Steering Wheel Force (Engine Switch)
 ftwx010068	Dial Indicator	
 ftwx010061	Torque Wrench	

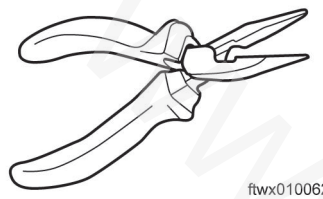
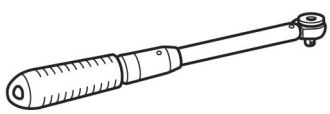
Equipments

V Bench	

SEATING

PREPARATION

Recommended Tools

 ftwx010083	Hexagon Wrench	Driver's/Front Passenger Backrest Driver's/Front Passenger Seat Base Assembly
 ftwx010062	Needle Nose Pliers	Driver's/Front Passenger Backrest
 ftwx010061	Torque Wrench	

SERVICE SPECIFICATIONS

SEAT BELT

REQUIRED TORQUE

Fastener	N·m
Driver's/front passenger seat belt retractor * body	45～55
Upper rivet point on driver's/front passenger seat belt * height adjustor	45～55
Lower rivet point on driver's/front passenger seat belt * body	45～55
Driver's/front passenger seat height adjustor * body	45～55

TRANSMISSION

SERVICE DATA

Transmission Model (JC538)

Transmission	Constant mesh, five speed
1st gear transmission ratio	4.016
2nd gear transmission ratio	2.318
3rd gear transmission ratio	1.401
4th gear transmission ratio	1.000
5th gear transmission ratio	0.723
Reverse gear transmission ratio	3.549
V. Axial clearance between reverse synchronizer ring & gear	0.15～0.30mm
Axial clearance between 5th gear synchronizer ring & gear	0.15～0.25mm
Axial clearance between 3rd gear synchronizer ring & gear	0.15～0.25mm
Axial clearance between 2nd gear synchronizer ring & gear	0.10～0.29mm
Axial clearance between 1st gear synchronizer ring & gear	0.15～0.25mm

REQUIRED TORQUE

Transmission Model (JC538)

Fastener	N•m
Oil Drain Plug	30～35
Connection between the transmission and the engine	30～35
Connection between the transmission and the body bracket	41～51
Switch, reverse lamp	30～35
Bolts of the reverse idler shaft fitting	38～49
positioning bolts of the gear shift fork	38～49
Front housing retaining bolts	30～35
Clutch housing retaining bolts	30～42

WHEEL & TIRE

SERVICE DATA

Tire Model		265/70R16 112T or 265/65R17 112T
Tire Pressure	Front	220±10Kpa
	Rear	240±10Kpa
	Spare	260±10Kpa

REQUIRED TORQUE

Fastener	N•m
Tire Nut	2WD: 111～131 (aluminum rim)
	4WD: 95～115 (aluminum rim)

DOOR & ENGINE HOOD

SERVICE DATA

Engine Hood	
Clearance	3.5 ± 1.0 mm
Evenness	0.5 ± 0.5 mm
Front Door	
Clearance	4.5 ± 1.5 mm
Evenness	-3.5 ± 1.0 mm
Rear Door	
Clearance	4.5 ± 1.5 mm
Evenness	-3.5 ± 1.0mm

REQUIRED TORQUE

Fastener	N•m
Door Hinge Bolt	34 ± 5

IGNITION

SERVICE DATA

Spark plug Sparkling Clearance	0.7～0.8mm

REQUIRED TORQUE

Fastener	N•m
Spark Plug	25
Ignition Coil	10

POWER STEERING

SERVICE DATA

Steering Oil		**ATF-III**
Steering oil temperature		
Oil level increase		⩽ 5 mm
Steering oil pressure	Engine idling, valve open and steering wheel at extreme position	8.5 ± 0.5MPa(ISF2.8)
		8.5 ± 0.5MPa(4G69)

REQUIRED TORQUE

Fastener	N•m	
	ISF2.8	**4G69**
Front retaining bolt of steering oil pump	20～25	20～25
Rear retaining bolt of steering oil pump	20～25	20～25
Retaining bolt of steering oil pump belt pulley	max:22	—
Steering gear retaining bolt	110～130	110～130
Retaining bolt of steering transmission shaft	25～30	25～30
Retaining nut of steering gear ball joint	84～100	84～100

ENGINE MECHANICAL SYSTEM

SERVICE DATA

Gasoline engine (4G69)

Engine Assembly		
Form		Inline 4-cylinder 4-stroke water-cooling SOHC 16-valve multi-point sequential injection
N•mber of Cylinders		4
Combustion Chamber		Roof-shaped combustion chamber
Displacement		2.374L
Cylinder Diameter		87mm
Travel		100mm
Maximum torque (rotational speed) [N•m(r/min)]		200/2500～3000
Rated power (rotational speed) [KW(r/min)]		100/5250
Compression Ratio		10
Lubrication System		Pressure feed, and full flow filter
Oil Pump Form		Gear type
Water Pump Form		Centrifugal impeller type
Generator pulley		
Tensioner Arm Protrusion	Standard	12mm
Tensioner Arm Press (98～196N)	Standard	≤1mm
Camshaft		
Cam Height	Intake Standard	37.20mm
	Limit	36.70mm
	Exhaust Standard	36.83mm
	Limit	36.33mm
Cylinder Head		
Cylinder Head Height	Standard	119.9～120.1mm
Lower Surface Flatness	Standard	0.03mm
	Limit	0.2mm
Surface Grinding Limit	Limit	0.2mm
Bolt Length	Standard	97.4mm
	Limit	≤99.4mm
Valve		
Edge Thickness	Intake Standard	1.0mm
	Limit	0.5mm
	Exhaust Standard	1.2mm

	Limit	0.7mm
Radial Clearance between Valve Rod & Guide	Valve Rod Diameter Standard	6.0mm
	Intake Standard	0.02～0.05mm
	Limit	0.10mm
	Exhaust Standard	0.03～0.07mm
	Limit	0.15mm
Caster	Standard	45°～45.5°
Valve Height	Intake Standard	112.30mm
	Limit	111.80mm
	Exhaust Standard	114.11mm
	Limit	113.61mm
Valve Spring		
Free Height	Standard	51.0mm
	Limit	50.0mm
Working Pre-tension/Working Height (kg/mm)	Standard	27.2/44.2
Verticality	Standard	≤2°
	Limit	≤4°
Valve Duct		
Belt Width in Contact	Standard	0.9～1.3mm
Inner Diameter	Standard	6.0mm
Outer Diameter	Standard	11.0mm
Pressed Height	Standard	14mm
Valve Rod Protrusion	Standard	49.3mm
	Limit	49.8mm
Engine Oil Pump Side Clearance	Driving Gear Standard	0.08～0.14mm
	Driven Gear Limit	0.06～0.12
Piston Clearance	Standard	0.02～0.04mm
Piston Ring		
Piston Pin	Outer Diameter Standard	22.0mm
Press Force (kg)		755～1750
Axial Clearance at Larger End of Connecting Rod	Standard	0.10～0.25mm
	Limit	0.4mm
Side Clearance between Piston Ring & Piston Ring Groove	Standard	0.02～0.06mm
	Limit	0.1mm
Crankshaft		

Crankshaft Pin Windage	Standard	0.02～0.05mm
	Limit	0.1mm
Axial Clearance	Standard	0.05～0.18mm
	Limit	0.25mm
Main Shaft Journal	Standard	57mm
Connecting Rod Journal	Standard	45mm
Axial Clearance of Main Shaft	Standard	0.02～0.04mm
	Limit	0.1mm
Cylinder Block		
Upper Surface Flatness	Standard	0.05mm
	Limit	0.1mm
Surface Grinding Limit	Limit	0.2mm
Full Height	Standard	284 ± 0.1mm
Inner Diameter of Cylinder Hole	Standard	87mm
Cylindricity	Standard	0.01mm

REQUIRED TORQUE

Gasoline engine (4G69)

Fastener	N•m
Timing Belt	
Retaining bolt of timing gear belt front lower cap	11
Retaining bolt of crankshaft shock absorber belt pulley	120
Retaining nut of water pump belt pulley	14
Retaining bolt of timing gear belt front middle cap	11
Retaining bolt of timing gear belt front upper cap	10
Retaining bolt of balance shaft gear belt pulley	42～48
Retaining bolt of balance shaft gear belt tensioner	48
Toothed Oil Pump Belt Pulley	55
Retaining bolt of tensioner arm	22
Retaining bolt of automatic tensioner	24
Toothed camshaft belt pulley bolt	90
Retaining bolt of timing belt tensioner B	48
Rock arm, rock arm shaft, hydraulic tappet & camshaft	
Retaining bolt of rock arm shaft	31
Retaining bolt of tight rock arm cap	4
Stop cap screw	19
Retaining bolt of cylinder head	78
Cylinder Head Bolt	20
Oil Drain Plug	45
Crankshaft, cylinder block & flywheel)	
Retaining bolt of crankshaft main bearing cap	25
Retaining bolt of flywheel	135
Oil Strainer	19
Retaining bolts of oil pump front cover	24

Diesel Engine

Fastener	N•m
Retaining bolt of right suspension assembly	95～100
Retaining bolt of left suspension assembly	95～100
Steering oil pump pipe	35～40
A/C compressor pipe	21～25
Starter retaining nut	68～72

Fastener	N•m
Alternator retaining nut	20～24

ENGINE CONTROL SYSTEM

SERVICE DATA

Gasoline Engine

ECT Sensor Resistance	0 ℃	5.1～6.5 Ω
	20 ℃	2.1～2.7 Ω
	40 ℃	0.9～1.3 Ω
	80 ℃	0.26～0.36 Ω
Engine idling RPM	Standard	750±50rpm
Idling stepping motor coil resistance	Standard	28～33 Ω (20°C)
Throttle valve position sensor resistance	Standard	3.5～6.5 Ω (20°C)
Intake temperature sensor resistance	0 ℃	5.3～6.7 Ω
	20 ℃	2.3～3.0 Ω
	40 ℃	1.0～1.5 Ω
	80 ℃	0.30～0.42 Ω
Knocking sensor resistance	Standard	>1M Ω
CKP sensor resistance	Standard	560 Ω ±10%(20°C)
Front oxygen sensor resistance	Pin 3 & 4	2.5～4.5 Ω (20°C)
Rear oxygen sensor resistance	Pin 3 & 4	2.5～4.5 Ω (20°C)
Canister solenoid valve resistance	Standard	19～22 Ω (20°C)

REQUIRED TORQUE

Gasoline Engine

Fastener	N•m
Engine control module (ECM) * body	15
ECT sensor * engine cylinder block	30
Idling stepping motor * throttle valve	4
Throttle valve position sensor * throttle valve	4
Intake manifold absolute pressure sensor/intake temperature sensor * intake manifold	24
Knocking sensor * cylinder block	24
CKP sensor * transmission flywheel housing	24
Front oxygen sensor * exhaust pipe	45
Rear oxygen sensor * exhaust pipe	45
Canister solenoid valve * engine bracket	9
Speed sensor * transmission	20

SUPPLEMENTAL RESTRAINT SYSTEM

SERVICE DATA

Air Bag System	
Working temperature	- 35～85 ℃
Working voltage	12 ± 3 V

REQUIRED TORQUE

Fastener	N•m
Horn button assembly (with air bag) * steering wheel	6 ± 1
Air bag ECU retaining nut	9 ± 1

BRAKE

SERVICE DATA

Brake Pedal		
Brake pedal height	Standard	192mm
Free travel of brake pedal	Standard	10mm
Remaining travel of brake pedal	Standard	25mm
Front brake		
Brake lining thickness	Standard	12mm
	Limit	2mm
Brake disc thickness	Standard	22mm
	Limit	21mm
Brake disc swing	Standard	0.1mm
	Limit	0.15mm
Rear brake		
Brake shoe thickness	Standard	7.5mm
	Limit	2.5mm
Shoe drum clearance		
Inner diameter of brake drum	Standard	295mm

REQUIRED TORQUE

Fastener	N•m
Master clutch cylinder pipe connector bolt	19～21
Retaining nut connecting brake pedal assembly and dashboard beam	20±2
Retaining nut connecting brake pedal assembly and master brake cylinder	20±2
Locking nut of brake lamp switch	18±2
Master Brake Cylinder Retaining Nut	15±3
Retaining nut of vacuum booster	20±2
Master brake cylinder oil pipe connector nut	22～24
Retaining bolt of front brake calipers	90～120
Rear wheel brake cylinder retaining bolt	19～21
Rear wheel brake cylinder oil pipe connector nut	19～21
Discharge plug	12±2
Brake fluid pipe connected to ABS executor	19～21(M10X1)
	22～24(M12X1)
ABS executor bracket and body	20±2
ABS executor and bracket	8±2
Retaining nut of front wheel speed sensor	8±2
Retaining nut of rear wheel speed sensor	8±2

REAR SUSPENSION

SERVICE DATA

Dimension parameter	
Rear wheel wheelbase	1580mm
Length of the rear suspension plate spring	1300mm

REQUIRED TORQUE

Fastener	N•m
Upper mounting bolt of rear shock absorber	95～115
Lower mounting bolt of rear shock absorber	95～115
Rear Leaf Spring	140～160
Exterior hanger plate	140～160

INTAKE

SERVICE DATA

Intake temperature sensor resistance	0℃	5.3～6.7kΩ
	20℃	2.0～3.0kΩ
	40℃	1.0～1.5.0kΩ
	80℃	0.30～0.42.0kΩ

REQUIRED TORQUE

Fastener	N•m
Air filter assembly retaining bolt	20

AIR-CONDITIONING SYSTEM

SERVICE DATA

Refrigerant filling volume	
When replacing compressor	Compressor has 150ml self-contained coolant and it is unnecessary to add some.
When replacing evaporator	50ml
When replacing fluid reservoir	30ml
Replace A/C pipe	40～50ml

REQUIRED TORQUE

Fastener	N•m
【Φ9 aluminum pipe, M16 * 1.5 threaded connector】	12～15
【Φ12 aluminum pipe, M22 * 1.5 threaded connector】	20～26
【Φ126 aluminum pipe, M24 * 1.5 threaded connector】	30～35
Central pipe of the heating water pipe	8～9
Connection between the A/C pipe and the compressor	21～25
Connection between the pipe and the condenser	8～9
Connection between the A/C pipe and the expansion valve	8～9
Connecting bolts of the compressor and the compressor bracket	40～45
Upper condenser fitting bolts.	20～24

COOLING

SERVICE DATA

Gas Engine

Engine coolant filling volume	6.5L
Thermostat trigger temperature	100℃

Diesel engine

Engine coolant filling volume	8～9L
Thermostat trigger temperature	95℃

REQUIRED TORQUE

Fastener	N•m
Radiator Assembly	46
Electronic Fan Assembly	23
Coolant Reservoir Assembly	23

CLUTCH

SERVICE DATA

Clutch pedal		
Clutch pedal height	Standard	170mm
Free travel of clutch pedal	Standard	10～15mm
Clutch		
Height gap of clutch diaphragm spring	Limit	0.5mm
Clutch lining thickness	Limit	0.3mm

REQUIRED TORQUE

Fastener	N·m
Clutch pedal retaining nut	15～26
Master clutch cylinder retaining nut	21～25
Master clutch cylinder oil pipe connector nut	21～25
Retaining nut of clutch booster assembly	21～25

INTERIOR & EXTERIOR TRIMS

REQUIRED TORQUE

Fastener	N·m
Driver's/front passenger seat belt retractor * body	45～55
Upper rivet point on driver's/front passenger seat belt * height adjustor	45～55
Lower rivet point on driver's/front passenger seat belt * body	45～55
Driver's/front passenger seat height adjustor * body	45～55
Driver's/front passenger seat base assembly * body	45～55

EMISSION CONTROL

REQUIRED TORQUE

Fastener	N·m
Retaining bolt of canister solenoid valve	9

EXHAUST

REQUIRED TORQUE

Fastener	N·m
Catalyst converter assembly	75～92
Connecting bolt between catalyst converter and bracket	22～27
Front exhaust pipe assembly & catalyst converter assembly	45～55
Front exhaust pipe assembly & muffler assembly	45～55
Muffler assembly & rear exhaust pipe assembly	45～55

START & CHARGE

SERVICE DATA

Alternator	
Rated voltage	13.5V
Rated current	120A
Rated RPM	6000r / min
Starter	
Voltage	12V
Output	2.5KW
Rotation direction	Clockwise
Battery rated voltage	12V

REQUIRED TORQUE

Fastener	N•m
Alternator * alternator bracket	46
Alternator adjusting bolt	
Alternator terminal nut	9～13(B+)
Retaining bolt of engine belt pulley	80～100
Starter Housing Retaining Bolt	43
Retaining bolt of electromagnetic switch	
Electromagnetic switch * magnetic coil	
Startup motor * power supply connection	
Startup motor * transmission housing	
Battery tray bracket * body	
Battery tray bracket * battery tray	21～25
Battery bracket	9～11
Battery terminal	9～11

FRONT SUSPENSION

SERVICE DATA

Front Wheel Alignment	
Front Hub	C-D/A+B:(2.2 ± 1) mm/(0.05 ± 0.05)′
Camber	25′ ± 30′
Kingpin caster	2.5° ± 30′
Kingpin inclination angle	12°05′ ± 30′

REQUIRED TORQUE

Fastener	N•m
Upper mounting bolt of front shock absorber	80～100
Lower mounting bolt of front shock absorber	110～130
Retaining bolt of lower swing arm ball joint bracket	120～150
Retaining nut connecting upper swing arm shaft and frame	120～140
Retaining nut of upper swing arm ball joint	85～145
Connecting bolt nut of lower swing arm and frame	150～190
Retaining nut of lower swing arm ball joint	130～190
Bolt connecting stabilizer bracket and frame	50～70
Retaining bolt of engine base plate	20～25
Nut connecting stabilizer connection and stabilizer	90～110
Nut connecting stabilizer connection and steering knuckle	90～110

AXLE & TRANSMISSION SHAFT

SERVICE DATA

Front Axle Assembly		
Driving/Driven Gear Type	Standard	Hypoid
Speed Ratio (Qty of Teeth)	Standard	3.91(43/11)
Driving/Driven Gear Gap (mm)	Standard	0.11～0.16
Driven Gear Swing (mm)	Max.	0.05
Differential Gear Type	Standard	Straight Bevel
Differential Gear Speed Ratio (Qty of Half Axle Teech/Qty of Planetary Teeth)	Standard	14/10
Differential Gear Gap (mm)	Standard	0～0.076
	Limit	0.2
Driving Gear Front Bearing (Ext. Dia. * Int. Dia. * Width)	Standard	79.4*36.5*29.4
Driving Gear Rear Bearing (Ext. Dia. * Int. Dia. * Width)	Standard	68.3*30.2*22.2
Differential Gear Bearing (Ext. Dia. * Int. Dia. * Width)	Standard	80*45.2*19.8
Inner Axle Bearing (Ext. Dia. * Int. Dia. * Width)	Standard	62*35*14
Electric Clutch Working Voltage	Standard	12V
Electric Clutch Radial Force	Standard	>80N
	Limit	120N(max)
Ventilation Tube Size (Ext. Dia. * Wall Thickness * Length)	Standard	Φ7*2*180
Driving Pionion Torque (N•m)	Standard	0.97～1.32
Driving gear flange assembly end runout		
Main Reducer Gear Oil	Model	Hyboid gear oil
	Usage	1.2L
Rear Axle Assembly		
Driving/Driven Gear Type	Standard	Hypoid
Driving/Driven Gear Clearance	Standard	0.127～0.203 mm
Half axle assembly end clearance (one side)	Standard	0.05～0.125mm
Main gear reduction ratio	Standard	3.91(43/11)
Wheelbase	Standard	1,580mm
Carrier Plate Distance	Standard	1114 ± 2mm
Rear Axle Noise	Standard	Below 77dB

Qty of Teeth	Standard	44
Distance t	Standard	≥4.1
Single tooth error tp	Standard	≤±4%
Accumulated error Tp	Standard	≤±4%
Gear top distance ratio A/t	Standard	0.4～0.5
Gear top circle diameter dk	Standard	＞60mm
Tooth width b	Standard	＞5mm
Tooth height h	Standard	＞2.5mm
Filler plug torque	Standard	27～41 N·m
Rear Reducer Gear Oil	Model	GL-5 85W/90
	Usage	(1.27±0.03)L Add 0.06L Houghton Sturaco 7098 under LSD condition

REQUIRED TORQUE

Fastener	N•m
Gear oil filler bolt of the rear differential	27～41
Retaining nuts of the rear half axle	50～60
Nut of leaf spring fastening plate	140～160
Lower mounting bolt of rear shock absorber	95～115
Brake Fluid Pipe	21～25
Bolt connecting transmission shaft cardin joint and main reducer pinion flange assembly	65～79
Connecting nuts of the pipe bracket and rear main reducer	38～45
Retaining bolts of the driven gear of rear differential	129～142
Retaining bolt of differential bearing cap	95～122
Rear cover retaining bolt	38～45
Bolt connecting transmission shaft cardin joint and transfer case flange assembly	65～79
Gear oil filler bolt of the front main reducer	41～51
Connecting nuts of the front main reducer right fitting and the front main reducer	78～98
Connecting nuts of the front main reducer left fitting and the front main reducer	78～98
Connecting nuts of the front main reducer fitting and the body	113～138
Bolts of the transfer case ventilation pipe	9～11
Retaining bolts of the front differential driven disc	78～88
Front differential bearing cap bolt	54～64
Front differential rear cover bolts	15～22
Front axle tube bolts	78～98
Rear main reducer oil filler plug	27～41
Rear main reducer oil drain plug	38～45
Front main reducer oil drain plug	59～69
Front main reducer oil filler plug	41～51
Nut connecting upper swing arm ball stud and steering knuckle	85～145
Nut connecting lower swing arm ball stud and steering knuckle	130～190
Connecting nuts of the column connecting rod and steering knuckle	50～70
Connecting bolts of the intermediate bearing bracket and body	58～70
Nut connecting front half axle (right) and intermediate shaft	63～77
Retaining bolts of the lower swing arm fitting	120～150

FUEL

SERVICE DATA

Gas Engine

Fuel tank volume		76L
Fuel standard		Euro IV emission standard
Fuel pump control working voltage		12V
Voltage value of the fuel level sensor	Maximum	13.5 ± 0.1V
	Minimum	8 ± 0.1V
Voltage value of the fuel level sensor	Maximum level	38 ± 1.5 Ω
	Minimum level	283 ± 6 Ω

Diesel engine

Fuel tank volume		76L
Fuel standard		Euro IV emission standard
Voltage value of the fuel level sensor	Maximum	13.5 ± 0.1V
	Minimum	8 ± 0.1V
Voltage value of the fuel level sensor	Maximum level	38 ± 1.5 Ω
	Minimum level	283 ± 6 Ω

REQUIRED TORQUE

Fastener	N•m
Retaining bolt of fuel tank door	15～20
Torque of the fuel tank retaining bolt	41～51
Torque of the retaining screws of the accelerator pedal assembly	9～11
Torque of the retaining screws of the oil level sensor	75

LUBRICATION

SERVICE DATA

Gasoline engine (4G69)

Gear side clearance	Driving Gear Standard	0.08～0.14mm
	Driven Gear Standard	0.06～0.12mm

REQUIRED TORQUE

Gasoline engine (4G69)

Fastener	N•m
Engine oil drain plug	45
Oil Filter	14N•m or 3/4 circle
Oil pan retaining bolt	7
Retaining bolt of oil pump cover	16
Engine Oil Pressure Switch	10

PARK BRAKE

REQUIRED TORQUE

Fastener	N•m
Park brake lever retaining bolt	20 ± 2
Baffle retaining bolt	20 ± 2
Retaining bolt of park brake cable	8 ± 2

STEERING SYSTEM

SERVICE DATA

Driving		
Turning radius	Min.	13.5m
Steering Wheel		
Free travel		±5°
Upward/downward adjustment travel		6.91mm
Steering force	Engine off	180N

REQUIRED TORQUE

Fastener	N•m
Steering wheel retaining nut	30.6～37.4
Retaining bolt of horn button assembly	6
Bolt connecting upper part of steering column assembly and steering column beam welded assembly	22
Bolt connecting lower part of steering column assembly and steering column beam welded assembly	22
Bolt connecting steering column assembly and steering transmission shaft	
Steering transmission shaft and steering column assembly	
Retaining bolt of steering transmission shaft housing	
Retaining nut of transfer case controller	12
Fuse box retaining bolt	12
Antitheft controller retaining nut	12
Reverse sensor controller retaining nut	12

SEATING

REQUIRED TORQUE

Fastener	N•m
Driver's/front passenger seat base assembly * body	45～55
Rear seat * body	21～25

WIPER & WASHER

SERVICE DATA

Wiper motor		
Wiper motor RPM	Low	45±5r / min
	High	60～80r / min

DIAGNOSTICS

ANTI-LOCK BRAKING SYSTEM (ABS)

PRECAUTIONS

1 . Disconnect the power supply.

(a) Before dismounting or installing any electric apparatus, or when tool or equipment is susceptible to touch exposed electric pins, be sure to disconnect the negative-pole cable of battery firstly to prevent persons or vehicle from being damaged.

(b) If there is special illustration, ignition switch must be closed.

⚠ **CAUTION**

If the vehicle is equipped with central console lock, don't leave the key inside the vehicle before disconnecting the negative battery cable, or it may automatically lock up.

2 . Dismantle assembly instrument or disconnect battery negative (-) may cause daily mileage and the clock to be reset.

⚠ **CAUTION**

The overall speedometer cannot be reset to zero.

3 . Disconnection the battery negative (-) may cause audio system lose the stored settings.

⚠ **CAUTION**

When reconnecting the negative cable of the battery, the sound system should be reset.

4 . Position definition, ignition switch.

Ignition switch (location)	Position definition, ignition switch
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START （ST）	Start the engine.

5 . Troubleshoot precautions of ABS antilock brake system.

(a) When the contact of the stitch or component mounting meet defects, dismantling and remounting the suspected defect components may make the system recover normal completely or temporarily.

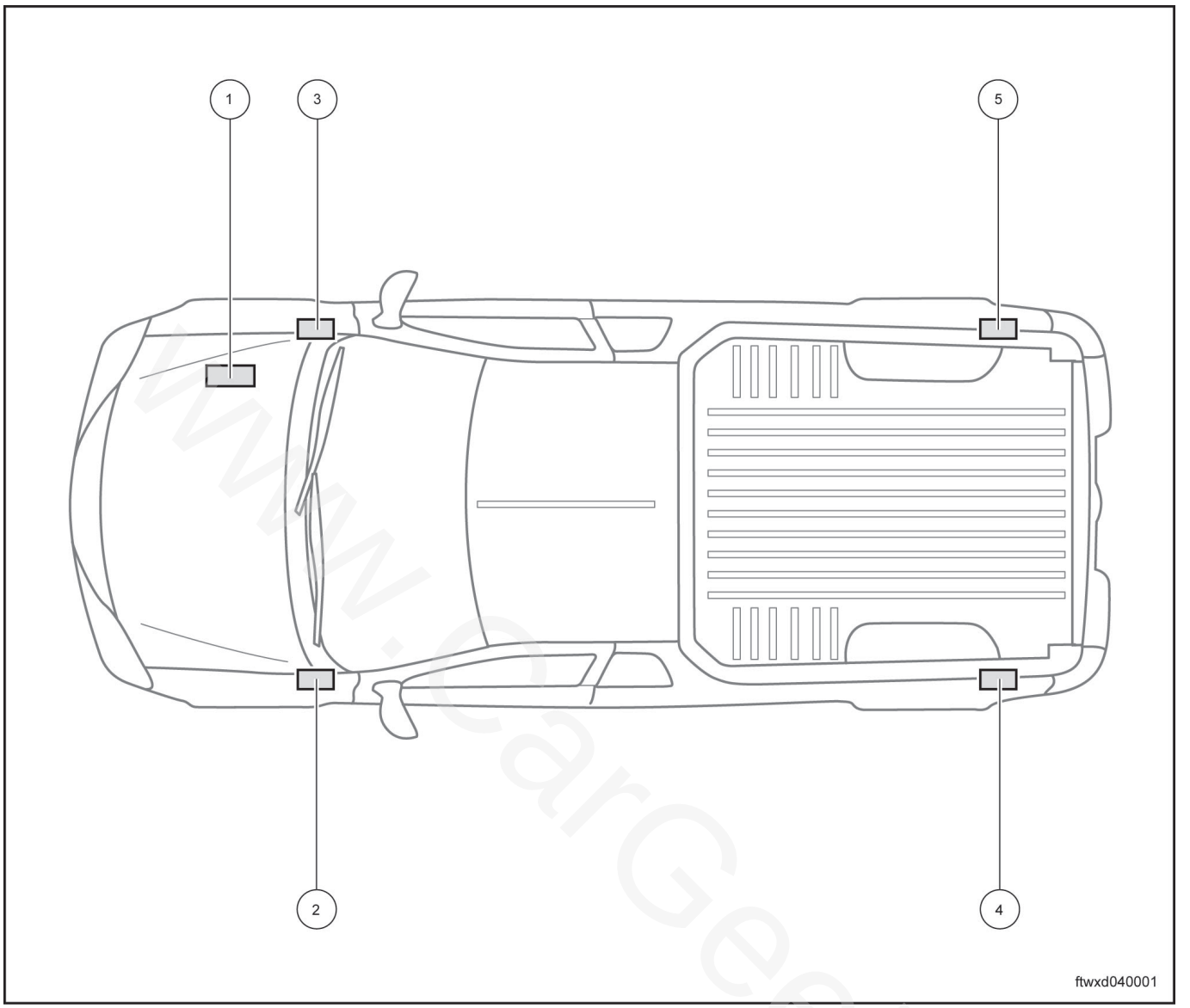
(b) To determine the failure location, it is required to check the condition of the vehicle when a failure occurs. For example, conduct checks as per the diagnosis failure code (DTC) output, and record the conditions before each connector is disconnected or any part is dismounted and remounted.

(c) Unless otherwise specified in the checking steps, ABS control unit, sensor and actuator must be dismantled and installed at the time when the ignition switch is closed.

(d) If reassemble ABS control unit, sensor and actuator that have been dismantled and installed, do remember to check whether the system is normal or not after assembling. (Observe relevant display of assembly instrument and use special detector to inspect diagnostic defect code (DTC). ）

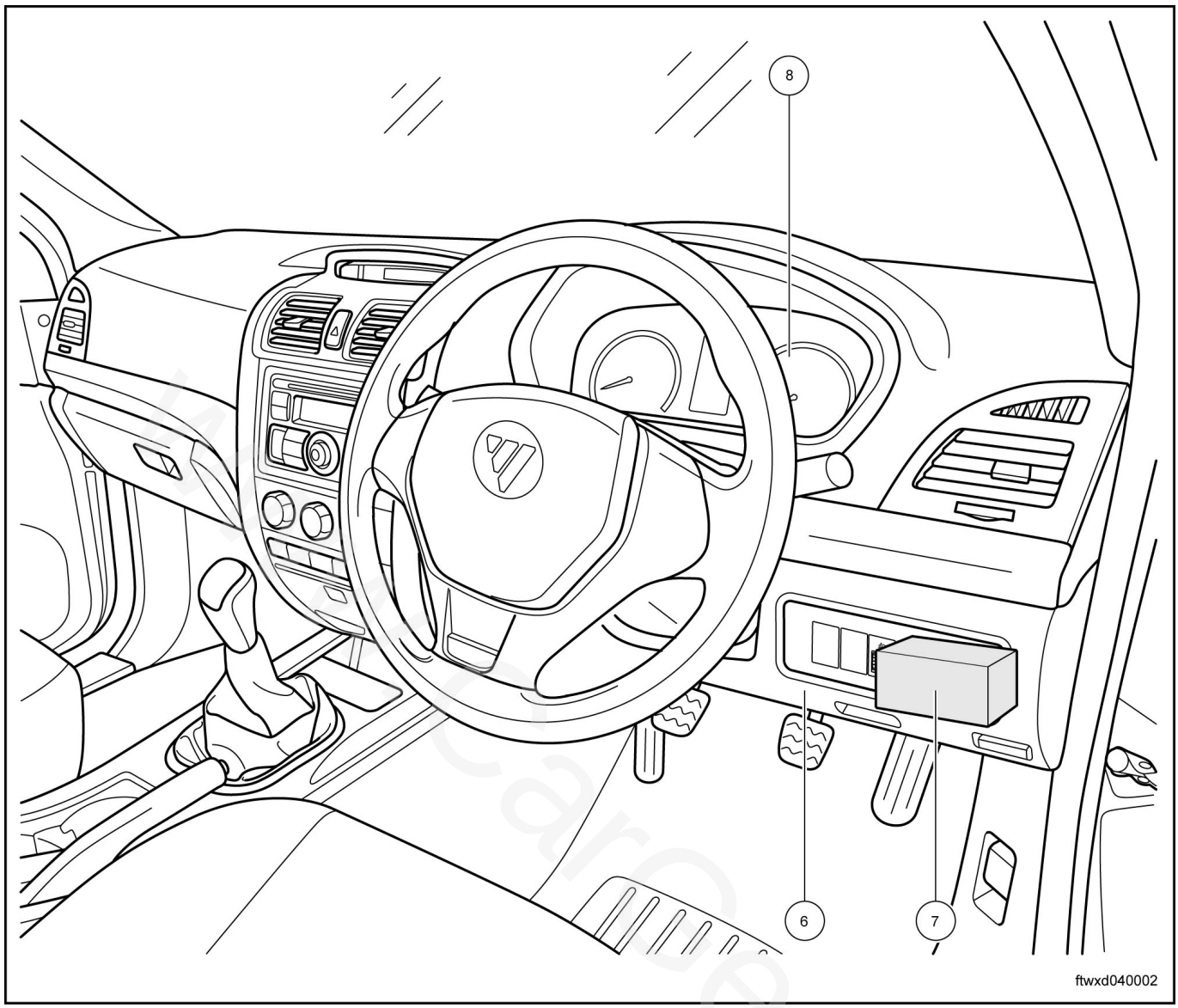
(e) Do not use multimeter to measure the stitch of ABS control unit.

COMPONENTS DRAWING



1	ABS Control Module
2	Left Front Wheel Speed Sensor
3	Right Front Wheel Speed Sensor

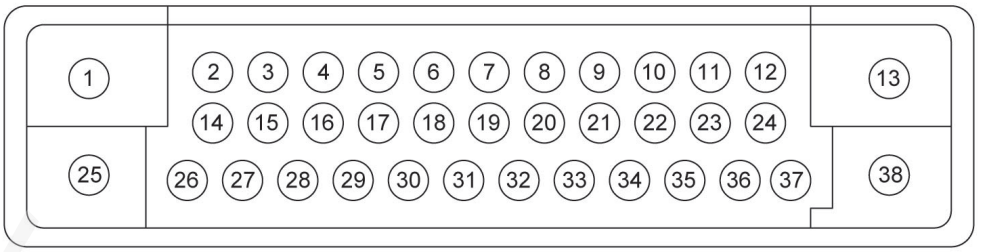
4	Left Rear Wheel Speed Sensor
5	Right Rear Wheel Speed Sensor



6	Travel Braking Switch
7	Indoor fuse box

8	Combination Instrument

THE CONNECTOR OF THE ABS CONTROL MODULE.



ftwxd040003

Number	Definition	Colour	Number	Definition	Colour
1	Power supply	Red	20	Left rear wheel speed sensor signal input	white
2	-	-	21	Left front wheel speed sensor signal output	Orange - red
3	-	-	22	-	-
4	-	-	23	-	-
5	Acceleration sensor signal	Green - yellow	24	-	-
6	Right front wheel speed sensor signal input	Orange - blue	25	Power supply	Red
7	-	-	26	CAN-H	Red-white
8	-	-	27	-	-
9	-	-	28	Ground of acceleration sensor	Brow-yellow
10	-	-	29	-	-
11	-	-	30	braking signal input	Grey - white
12	-	-	31	Right rear wheel speed sensor signal input	Green - white
13	ground	Black	32	Ig power supply	Orange - red
14	CAN-L	Blue-yellow	33	left rear wheel speed sensor signal output	White - red

Number	Definition	Colour	Number	Definition	Colour
15	Acceleration sensor power supply	Purple -yellow	34	Left front wheel speed sensor signal input	Red-blue
16	-	-	35	-	-
17	-	-	36	-	-
18	Right front wheel speed sensor signal output	Yellow	37	-	-
19	Right rear wheel speed sensor signal output	Blue-red	38	ground	Black

DIAGNOSTIC TROUBLE CODE (DTC)LIST

⚠ CAUTION

When checking DTC in the checking module, if certain DTC displayed, then the circuit of the code listed in the following list should be checked. The detailed description of each DTC can refer to corresponding pages.

DTC code	Diagnostic items (DTC definition)	Trouble location
C1900	Voltage trouble of supplying power of the low voltage- The voltage is too high	• Battery • Charging system
C1901	Voltage trouble of supplying power of the low voltage- The voltage is insufficient	• Battery • Charging system
C0032	C0032 – Left front wheel speed sensor circuit failure: open circuit or short circuit	• Left front wheel speed sensor • Left front wheel speed sensor circuit • Left front wheel speed sensor signal wheel
C0031	Left front wheel speed sensor failure: The scope, performance, continuity	• Left front wheel speed sensor • Left front wheel speed sensor circuit • Left front wheel speed sensor signal wheel
C0035	Right front wheel speed sensor circuit failure: open circuit or short circuit	• right front wheel speed sensor • Right front wheel speed sensor circuit • right front wheel speed sensor signal wheel
C0034	right front wheel speed sensor failure: The scope, performance, continuity	• right front wheel speed sensor • Right front wheel speed sensor circuit • right front wheel speed sensor signal wheel
C0038	Left rear wheel speed sensor circuit failure: open circuit or short circuit	• Left rear wheel speed sensor • Left rear wheel speed sensor circuit • Left rear wheel speed sensor signal wheel
C0037	Left rear wheel speed sensor failure: The scope, performance, continuity	• Left rear wheel speed sensor • Left rear wheel speed sensor circuit • Left rear wheel speed sensor signal wheel
C003B	Right rear wheel speed sensor circuit failure: open circuit or short circuit	• right rear wheel speed sensor • Right rear wheel speed sensor circuit

DTC code	Diagnostic items (DTC definition)	Trouble location
		• Right rear wheel speed sensor signal wheel
C003A	Right rear wheel speed sensor failure: The scope, performance, continuity	• right rear wheel speed sensor • Right rear wheel speed sensor circuit • Right rear wheel speed sensor signal wheel
C1099	Wheel speed sensor frequency error	• ABS control units • ABS system circuit
C1000	Hardware failure of electronic control unit	• ABS control units
C1001	Hardware failure of CAN line	• ABS control units • ABS system circuit
U1000	Bus off failure of CAN line	• ABS control units • ABS system circuit
C1095	Valve relay failure	• fuse • ABS system circuit
C0010	Left front liquid intake valve failure	• Left front liquid intake valve • ABS control units
C0011	Left front liquid output valve failure	• Left front liquid output valve • ABS control units
C0014	Right front liquid intake valve failure	• Right front liquid intake valve • ABS control units
C0015	Right front liquid output valve failure	• Right front liquid output valve • ABS control units
C0018	Left rear liquid intake valve failure	• Left rear liquid intake valve • ABS control units
C0019	Left rear liquid output valve failure	• Left rear liquid output valve • ABS control units
C001C	Right rear liquid intake valve failure	• Right rear liquid intake valve • ABS control units
C001D	C001D	• Right rear liquid output valve • ABS control units
C0020	Return pump failure (motor)	• fuse • ABS system circuit
C0072	General trouble of valve(overheat protection)	• fuse • ABS system circuit

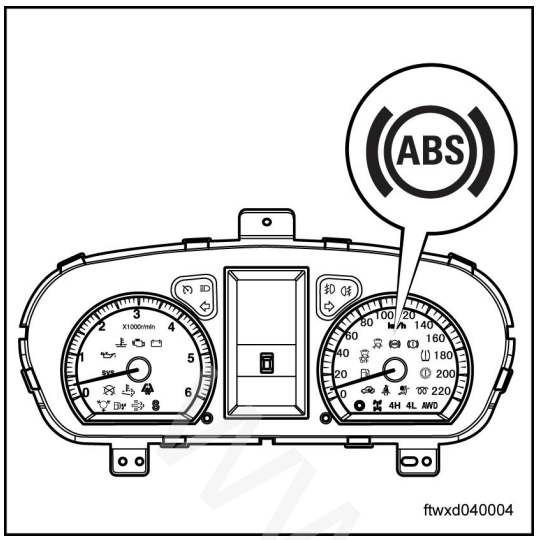
DEFECT PHENOMENON FORM

⚠ CAUTION

- **If defects code fails to appear when checking DTC, and the components of the system don't work normally, check the circuit in line with the defect phenomenon listed in the following form.**
- **While replacing ABS control module, sensor and actuator, the ignition switch shall be turned to OFF position, and the negative cable of battery shall be disconnected.**
- **Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.**

Defect phenomenon	Trouble location	Reference
ABS system doesn't work	1.Confirm that DTC outputs normal code of system	Chapter 35.Travel Braking – master braking pump, overhaul
	2. Braking pipeline leakage, damage, distortion etc.	Chapter 35. Travel Braking - front disc braking, overhaul
	3. ABS control module assembly	Chapter 35. Travel Braking - rear disc braking, overhaul
ABS system can't work efficiently	1.Confirm that DTC outputs normal code of system	Chapter 35.Travel Braking – master braking pump, overhaul
	2. Braking pipeline leakage, damage, distortion etc.	Chapter 35. Travel Braking - front disc braking, overhaul
	3. ABS control module assembly	Chapter 35. Travel Braking - rear disc braking, overhaul
ABS indicating lamp is always on.	1. ABS indicating lamp circuit	Chapter 04 Diagnosis - ABS, ABS indicating lamp is always on
	2. ABS control module assembly	Chapter 04 Diagnosis - ABS, ABS indicating lamp is always on
ABS indicating lamp is not bright.	1. ABS indicating lamp circuit	Chapter 04 Diagnosis - ABS, ABS indicating lamp is always on
	2. ABS control module assembly	Chapter 04 Diagnosis - ABS, ABS indicating lamp is always on

PRE-INSPECTION



1 . Self-diagnosis system

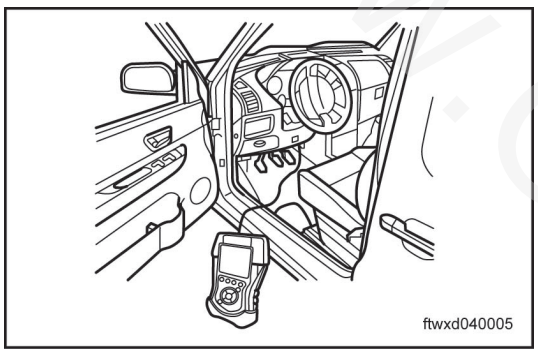
(a) Open the ignition switch to ON position, check the ABS indicating lamp on the combination instrument.

Standard: ABS indicating lamp will go out automatically 3-4 seconds after the ignition switch is turn on.

If ABS indicating lamp is , it shows that there are circuit troubles in the system, maintenance shall be carried out after reading the diagnostic trouble code(DTC) by using the diagnostic apparatus.

⚠ **CAUTION**

After the ignition switch is turned to ON position, the ABS control module will inspect the electric apparatus and components in the system.



2 . Reading and clearance of the trouble code (DTC)

(a) Use diagnostic apparatus to read diagnostic trouble code (DTC)

- Connect the diagnostic apparatus and DLC- data chain socket connector(diagnostic box).
- Click to enter " Beiqi Futian - pika - ABS - read the trouble code ", the diagnostic apparatus will display diagnostic trouble code in the ABS control module.

(b) Clearing diagnostic trouble code

- Click to enter " Clear trouble code "

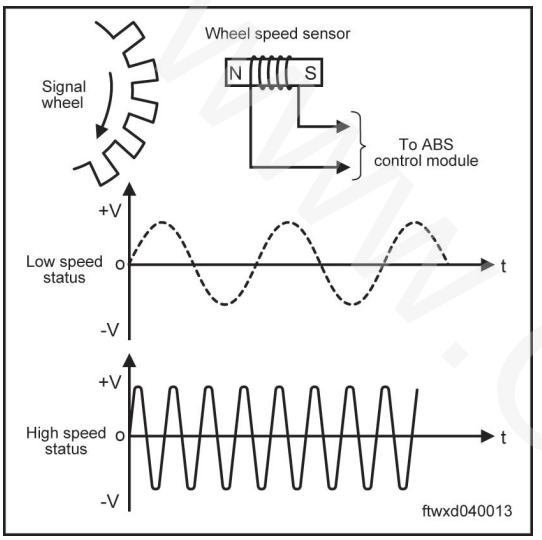
Clear the diagnostic trouble code in the ABS control module through operating diagnostic apparatus.

C0031 – LEFT FRONT WHEEL SPEED SENSOR FAILURE: THE SCOPE, PERFORMANCE, CONTINUITY

C0032 – LEFT FRONT WHEEL SPEED SENSOR CIRCUIT FAILURE: OPEN CIRCUIT OR SHORT CIRCUIT

C0034 – RIGHT FRONT WHEEL SPEED SENSOR FAILURE: THE SCOPE, PERFORMANCE, CONTINUITY

C0035 – RIGHT FRONT WHEEL SPEED SENSOR FAILURE: OPEN CIRCUIT OR SHORT CIRCUIT



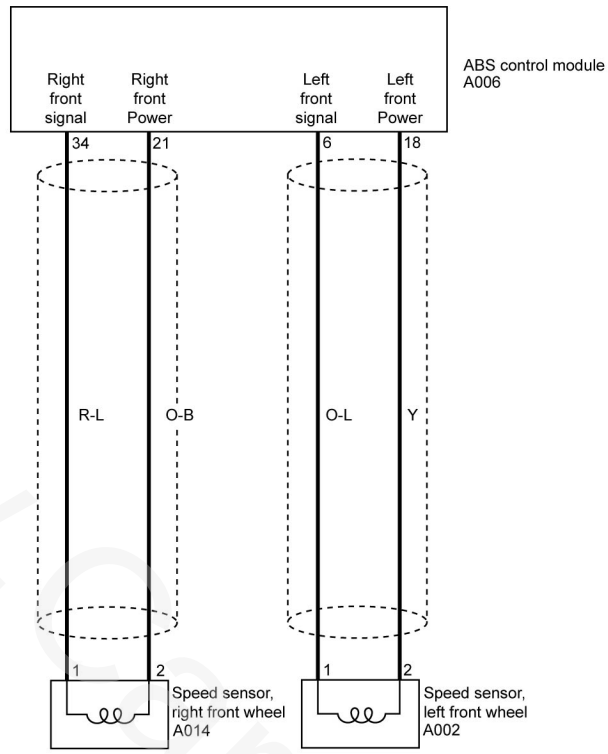
Speed sensor detects wheel speed and transmits speed signal to the ABS module. ABS system uses these signals to control each actuator.

When the signal wheel rotates, its wire will intersect with the magnetic line of force of the magnet in the speed sensor, therefore, an alternate current voltage (AC) is produced. Because the voltage frequency of the AC voltage is proportional to the rotational speed of signal wheel, the speed of the wheel can be detected.

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
C0301 C0302 C0304 C0305	• If the vehicle speed is not lower than 20km/h, no signal will be input to the ABS module within 15 seconds. • When the ignition switch is changed from OFF position to ON position, the wheel speed sensor signal will be interrupted momentarily. • Wheel speed sensor circuit is open	• Right front, left front wheel speed sensor • Right front, left front wheel speed sensor circuit • Right front, left front sensor signal wheel

Circuit Diagram



Diagnostic step

1 . Read DTC and data on the diagnostic apparatus

(a) Choose mode for reading dataflow in diagnostic apparatus.

(b) Check whether the speed showing on the speed meter on the instrument is consistent to that of the diagnostic apparatus when the vehicle is running.

⚠ **CAUTION**

It is a normal scope if the difference of vehicle speed value of instrument and the diagnostic apparatus is within ± 10%,.

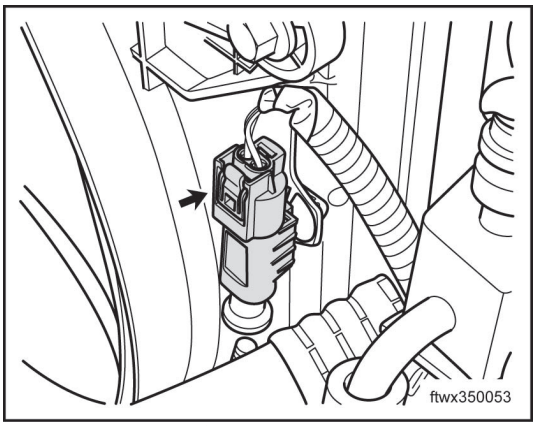
Check whether the result is normal?

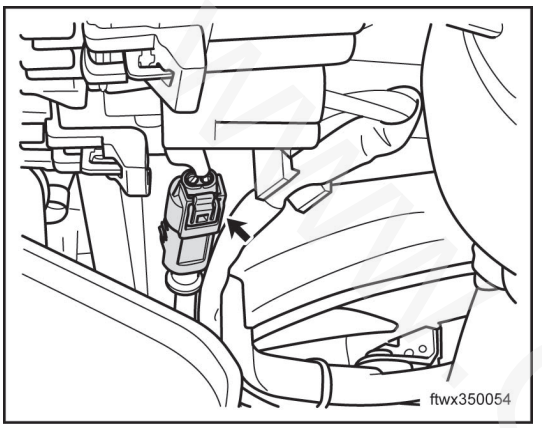
Yes > If the values are identical, go to step 5.

No > If the values are different, go to step 2.

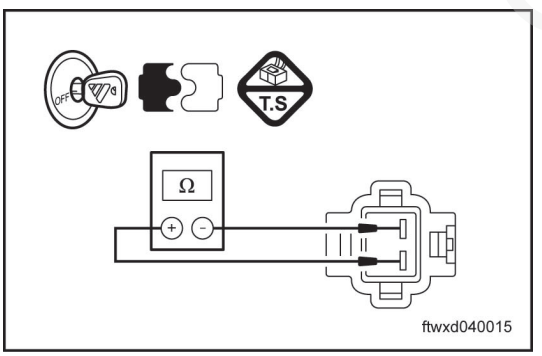
2 . Check the front wheel speed sensor

(a) Ignition switch: Switch to OFF Disconnect both the positive and negative poles of the battery terminal and dismantle the battery.





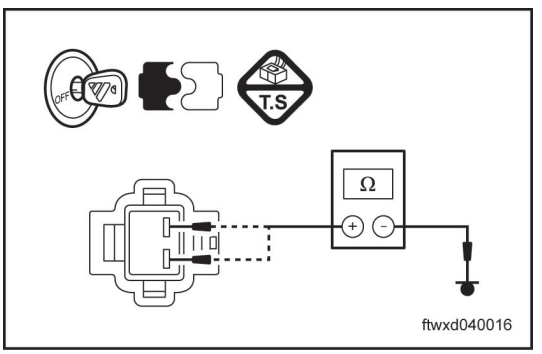
(b) Disconnect the connector A002 of right front wheel speed sensor and the connector A014 of left front wheel speed sensor.



(c) Measure the voltage value between the pins of right front and left front wheel speed sensor.

Standard electrical resistance (check whether there existent an open circuit)

Connection of the multimeter	Standard value
A002（1）-A002（2）	0.9-1.8KΩ
A014（1）-A014（2）	



(d) Measure the voltage between the pin of the connector of wheel speed sensor and ground.

Standard resistance (check whether there is short circuit)

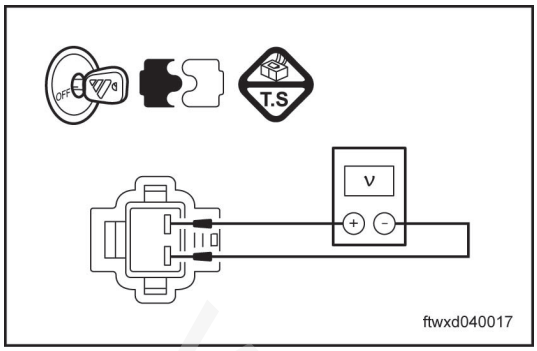
Connection of the multimeter	Standard value
A002 (1) - ground	⩾ 1 MΩ
A002 (2) - ground	
A014 (1) - ground	
A014 (2) - ground	

Check whether the result is normal?

Yes> go to step 3

If no > maintain or replace the wheel speed sensor..

3 . Check the left front wheel speed sensor output signal



(a) Check output voltage of the right front, left front wheel speed sensor while rotating.

Standard voltage

Connection of the multimeter	Standard value
A002（1）-A002（2）	120 mV
A014（1）-A014（2）	

CAUTION

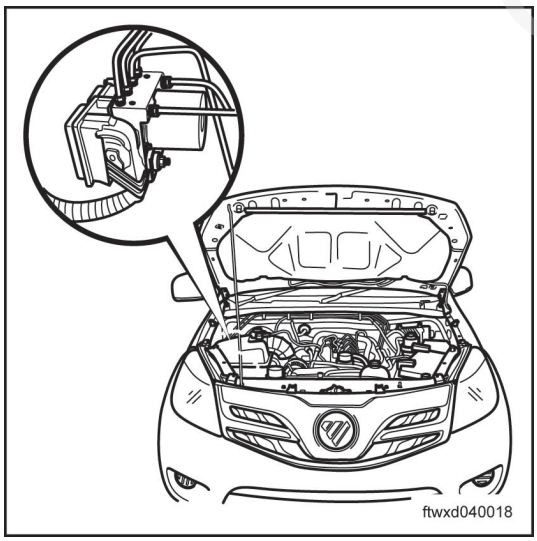
The multimeter should be set in millivolt grade while operating. Check output voltage of the left front wheel speed sensor while rotating at a speed of 2 rounds per second.

Check whether the result is normal?

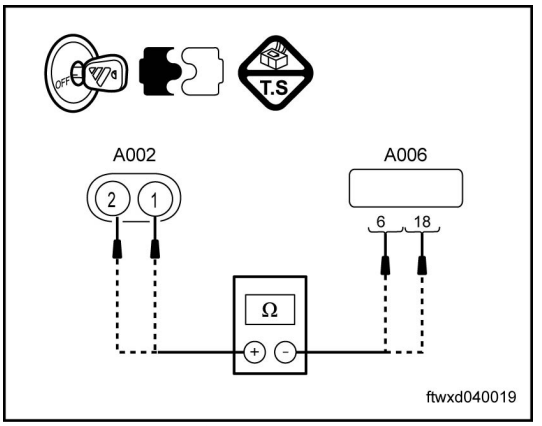
Yes> go to step 4

No> go to step 5

4 . Check harness and connector



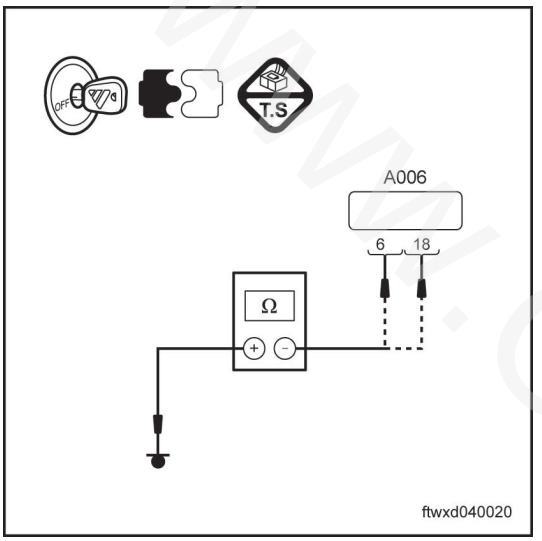
(a) disconnect the connector A006 of the ABS module.



(b) Measure the resistance of the connectors of the harness as per the values given in the table below

Standard electrical resistance (check whether there existent an open circuit)

Connection of the multimeter	Standard value
A006（6）-A002（1）	＜2Ω
A006（18）-A002（2）	
A006（34）-A014（1）	
A006（21）-A014（2）	



(c) Measure whether there is short circuit between harness pins

Standard voltage

Connection of the multimeter	Standard value
A006（6）- ground	⩾ 1 MΩ
A006（18）- ground	
A006（34）- ground	
A006（21）- ground	

Check whether the result is normal?

Yes >Maintain or change the ABS control module.

No > Maintain or replace the harness and connectors

5 . Check right front, left front wheel speed sensor installation

(a) Check right front, left front wheel speed sensor installation

⚠ **CAUTION**

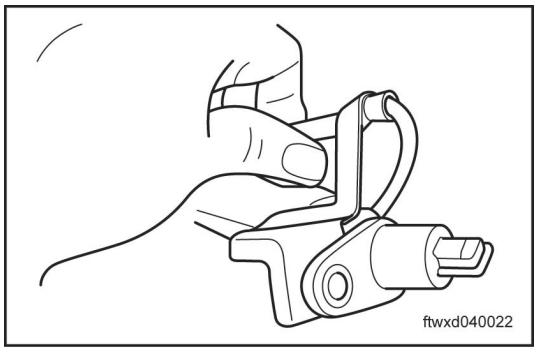
The installation bolt shall be fastened appropriately, and the position of installation of sensor should be leveled.

Check whether the result is normal?

Yes> go to step 6

No > maintain or replace the wheel speed sensor..

6 . Check right front, left front wheel speed sensor signal terminal



(a) Check right front, left front wheel speed sensor signal terminal

⚠ **CAUTION**

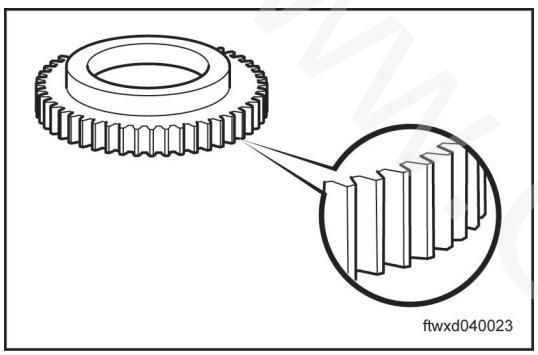
The sensor signal terminal shall be free of scratch or absorbing broken metal scraps.

Check whether the result is normal?

Yes> go to step 7

No > Clean corresponding wheel speed sensor signal terminal.

7 . Check the sensor signal gear



(a) Check the teeth of signal gear.

⚠ **CAUTION**

- **The signal gear shall be free of scratch, absorbing the broken metal scarps or external material.**
- **If there are outside materials, the output voltage shall be checked after taking them out.**

Check whether the result is normal?

Yes >Maintain or change the ABS control module.

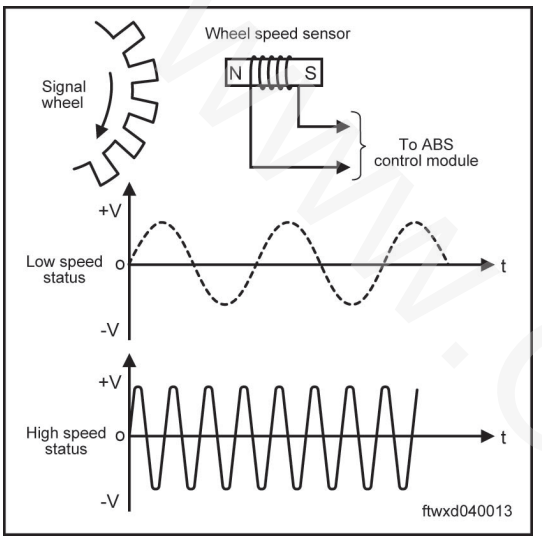
No > Clean corresponding speed sensor signal gear.

C0038 – LEFT REAR WHEEL SPEED SENSOR CIRCUIT FAILURE: OPEN CIRCUIT OR SHORT CIRCUIT

C0037 – LEFT REAR WHEEL SPEED SENSOR FAILURE: THE SCOPE, PERFORMANCE, CONTINUITY

C003B – RIGHT REAR WHEEL SPEED SENSOR CIRCUIT FAILURE: OPEN CIRCUIT OR SHORT CIRCUIT

C003A – RIGHT REAR WHEEL SPEED SENSOR FAILURE: THE SCOPE, PERFORMANCE, CONTINUITY



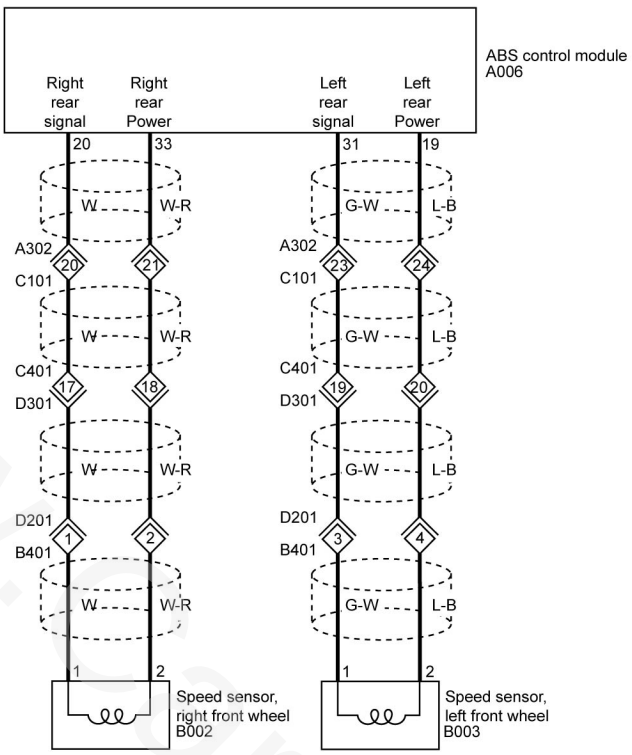
Speed sensor detects wheel speed and transmits speed signal to the ABS module. ABS system uses these signals to control each actuator.

When the signal wheel rotates, its wire will intersect with the magnetic line of force of the magnet in the speed sensor, therefore, an alternate current voltage (AC) is produced. Because the voltage frequency of the AC voltage is proportional to the rotational speed of signal wheel, the speed of the wheel can be detected.

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
C003A C003B C0037 C0038	• If the vehicle speed is not lower than 20km/h, no signal will be input to the ABS module within 15 seconds. • When the ignition switch is changed from OFF position to ON position, the wheel speed sensor signal will be interrupted momentarily. • Wheel speed sensor circuit is open	• Right rear, left rear wheel speed sensor • Right rear, left rear wheel speed sensor circuit • Right rear, left rear sensor signal wheel

Circuit Diagram



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Diagnostic step

1 . Read DTC and data on the diagnostic apparatus

(a) Choose mode for reading dataflow in diagnostic apparatus.

(b) Check whether the speed showing on the speed meter on the instrument is consistent to that of the diagnostic apparatus when the vehicle is running.

⚠ **CAUTION**

It is a normal scope if the difference of vehicle speed value of instrument and the diagnostic apparatus is within ± 10%,.

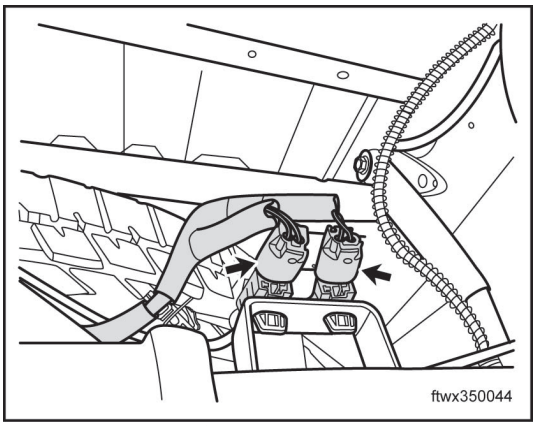
Check whether the result is normal?

Yes > If the values are identical, go to step 5.

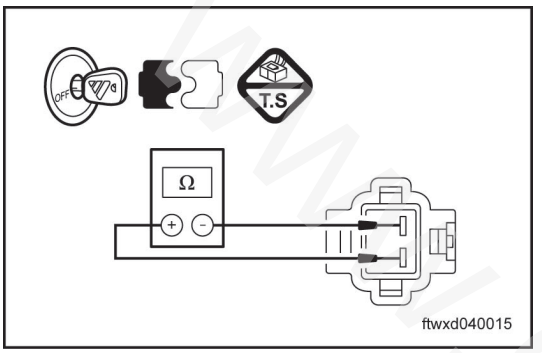
No > If the values are different, go to step 2.

2 . Check the left rear wheel speed sensor

(a) Ignition switch: Switch to OFF Disconnect both the positive and negative poles of the battery terminal and dismantle the battery.



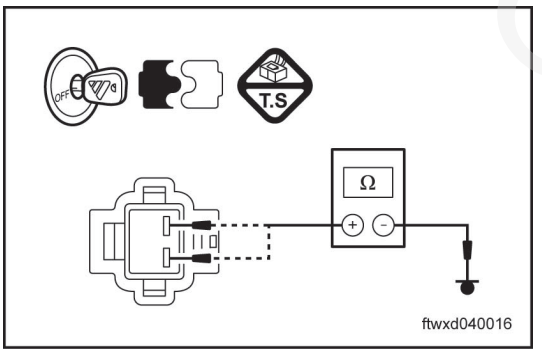
(b) Disconnect the socket connector B003 of right rear wheel speed sensor and the socket connector B002 of left rear wheel speed sensor.



(c) Measure the voltage value between the pins of right and left rear wheel speed sensors.

Standard electrical resistance (check whether there existent an open circuit)

Connection of the multimeter	Standard value
B003（1）-B003（2）	0.9 - 1.8 KΩ
B002（1）-B002（2）	



(d) Measure the voltage between the pin of the connector of wheel speed sensor and ground.

Standard resistance (check whether there is short circuit)

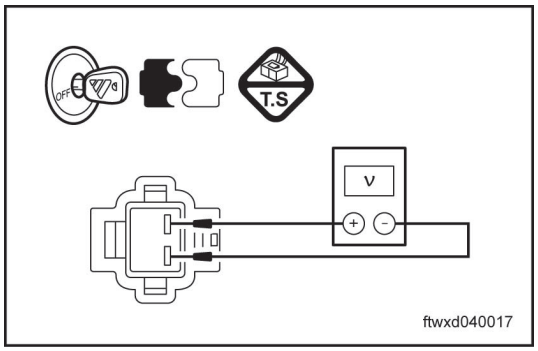
Connection of the multimeter	Standard value
B003（1） - ground	⩾ 1 MΩ
B003（2） - ground	
B002（1）- ground	
B002（2）- ground	

Check whether the result is normal?

Yes> go to step 3

If no > Replace or change the wheel speed sensor..

3 . Check the left rear wheel speed sensor output signal



(a) Check output voltage of the right rear, left rear wheel speed sensors while rotating.

Standard voltage

Connection of the multimeter	Standard value
B003（1）-B003（2）	120 mV
B002（1）-B002（2）	

⚠ CAUTION

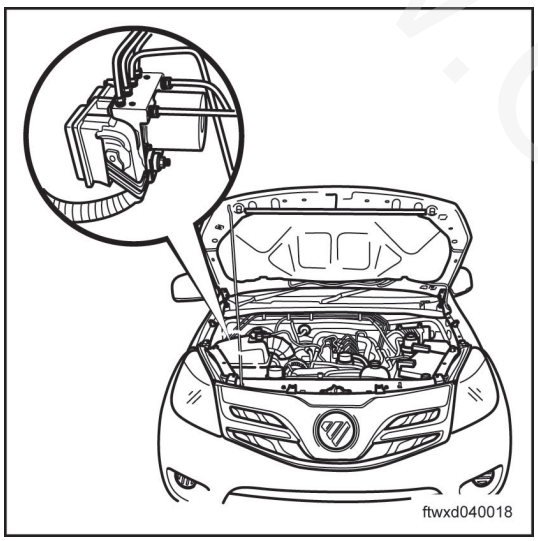
The multimeter should be set in millivolt grade while operating. Check output voltage of the left rear wheel speed sensor while rotating at a speed of 2 rounds per second.

Check whether the result is normal?

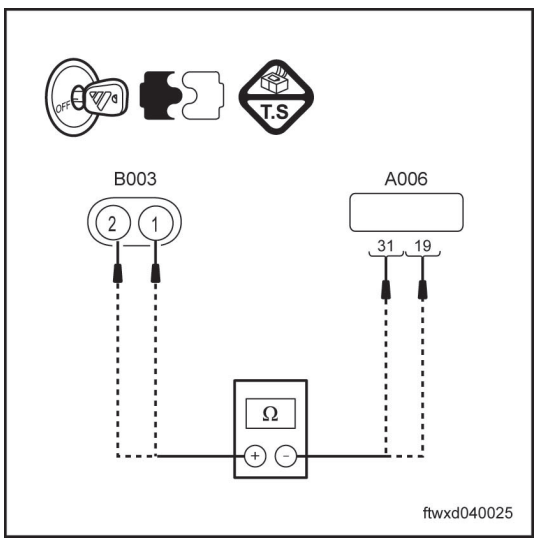
Yes> go to step 4

No> go to step 5

4 . Check harness and connector



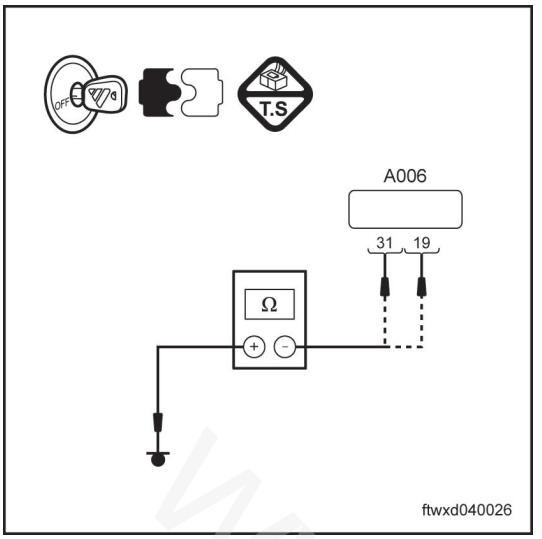
(a) disconnect the connector A006 of the ABS module.



(b) Measure the resistance of the connectors of the harness as per the values given in the table below

Standard electrical resistance (check whether there existent an open circuit)

Connection of the multimeter	Standard value
A006（31）-B003（1）	＜2Ω
A006（19）-B003（2）	
A006（20）-B002（1）	
A006（33）-B002（2）	



(c) Measure whether there is short circuit in the resistance between harness pins

Standard voltage

Connection of the multimeter	Standard value
A006（31）- ground	⩾ 1 MΩ
A006（19）- ground	
A006（20）- ground	
A006（33）- ground	

Check whether the result is normal?

Yes >Maintain or change the ABS control module.

No > Maintain or replace the harness and connectors

5 . Check right rear, left rear wheel speed sensor installation

(a) Check right rear, left rear wheel speed sensor installation

⚠ **CAUTION**

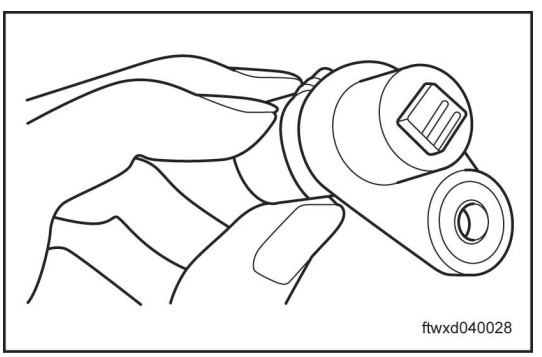
The installation bolt shall be fastened appropriately, and the position of installation of sensor should be leveled.

Check whether the result is normal?

Yes> go to step 6

No > maintain or replace the wheel speed sensor..

6 . Check right rear, left rear wheel speed sensor signal terminal



(a) Check right rear, left rear wheel speed sensor signal terminal

⚠ **CAUTION**

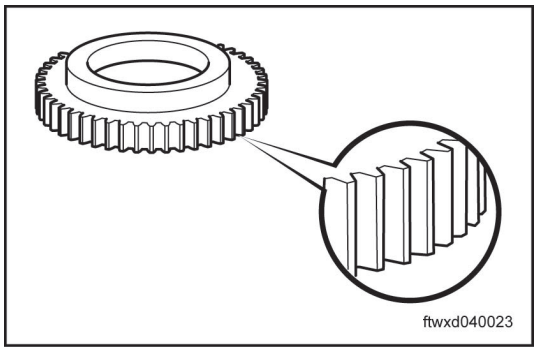
The sensor signal terminal shall be free of scratch or absorbing broken metal scraps.

Check whether the result is normal?

Yes> go to step 7

No > Clean corresponding wheel speed sensor signal terminal.

7 . Check the sensor signal gear



(a) Check the teeth of signal gear.

⚠ **CAUTION**

- **The signal gear shall be free of scratch, absorbing the broken metal scarps or external material.**
- **If there are outside materials, the output voltage shall be checked after taking them out.**

Check whether the result is normal?

Yes >Maintain or change the ABS control module.

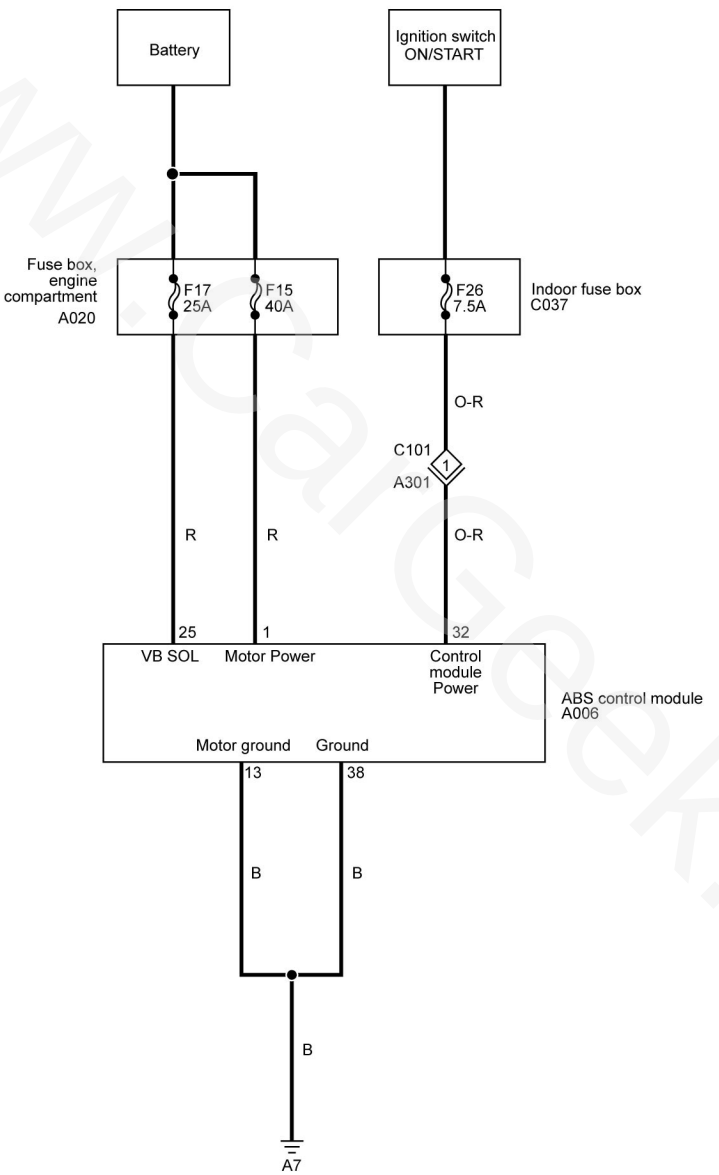
No > Clean corresponding speed sensor signal gear.

C1095—VALVE RELAY FAILURE

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
C1095	• The power supply of electromagnetic valve is at low electric potential state	• ABS electromagnetic valve power supply circuit

Circuit Diagram



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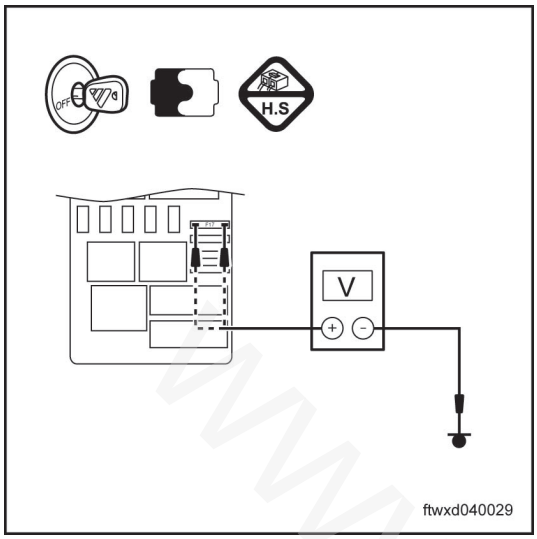
Diagnostic step

1 . Check the relay and fuse (fuse box inside the vehicle)



(a) Check the fuse F17 in the in-vehicle fuse box.

Standard voltage

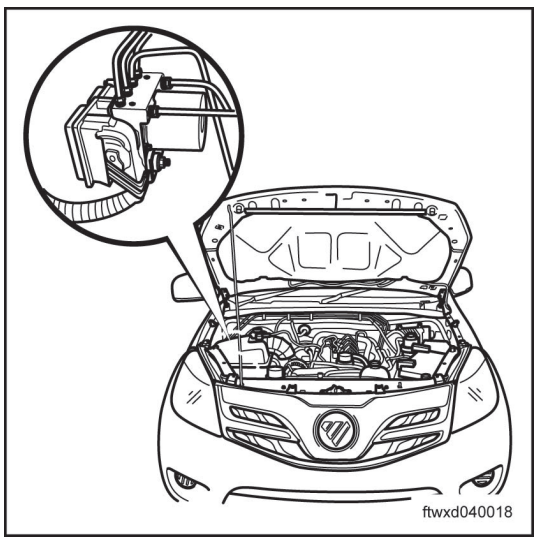
Connection of the multimeter	Standard value
Fuse F17-ground	Battery voltage
Fuse F17-ground	

Check whether the result is normal?

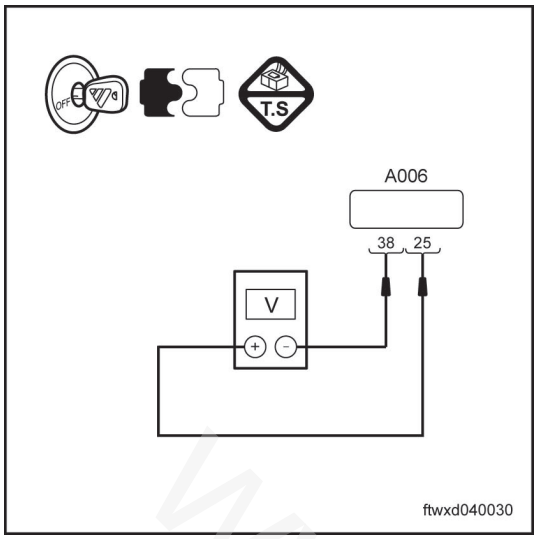
Yes> go to step 2

No > The voltages of both ends of the fuse are different, go to step 3.

2 . Check the connector of the ABS control module.



(a) disconnect the connector A006 of the ABS module.



(b) Measure the voltage between the pin 25 and pin 38 of the connector A006 of ABS control module.

Standard voltage

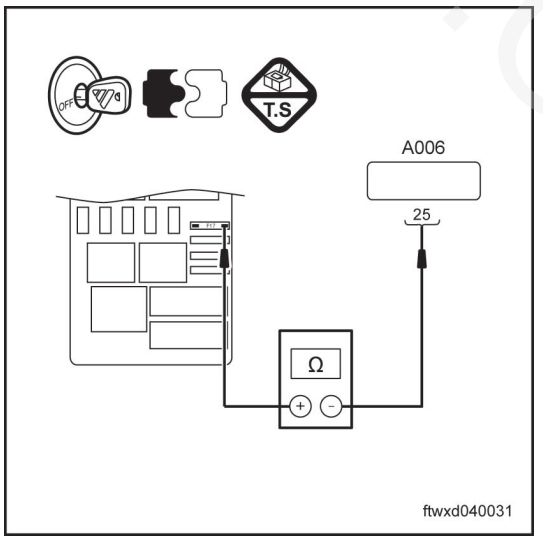
Connection of the multimeter	Standard value
A006（25）-A006（38）	Battery voltage

Check whether the result is normal?

Yes >Maintain or change the ABS control module.

No> go to step 3

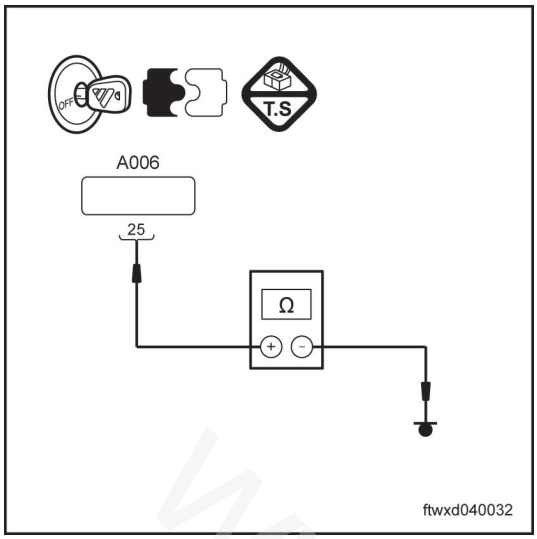
3 . Check harness and connector



(a) Pull out the fuse F17 and measure the resistance value between the output end of fuse and the pin 25 of the connector A006 of ABS control module.

Standard resistance (check for any open circuit)

Connection of the multimeter	Standard value
A006（25）-F17	＜2Ω



(b) Measure the voltage between the pin 25 of the connector A006 of ABS control module and ground.

Standard resistance (check whether there is short circuit)

Connection of the multimeter	Standard value
A006（25）- ground	⩾ 1 MΩ

04

Check whether the result is normal?

Yes > Replace fuse F17（25A）.

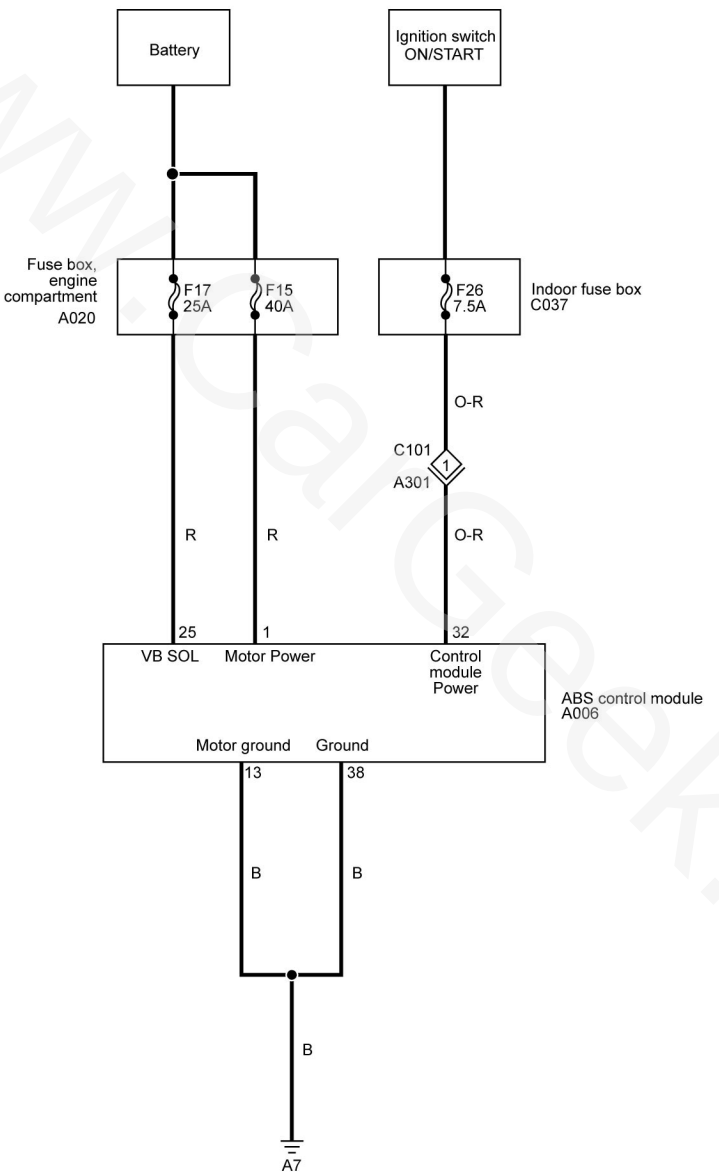
No > Maintain or replace the harness and connectors

C0020 – RETURN PUMP FAILURE

Diagnostic Logic

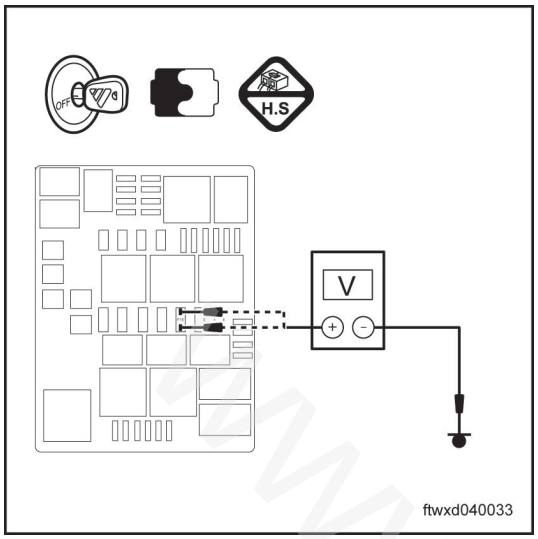
DTC code	DTC inspection conditions	Trouble location
C0020	• The abnormal operation of pump motor under self-check state.	• ABS pump motor circuit • ABS control module (pump motor)

Circuit Diagram



Diagnostic step

1 . Check the relay and fuse (vehicle-body fuse box)



(a) Check the fuse F15 inside the vehicle-body fuse box.

Standard voltage

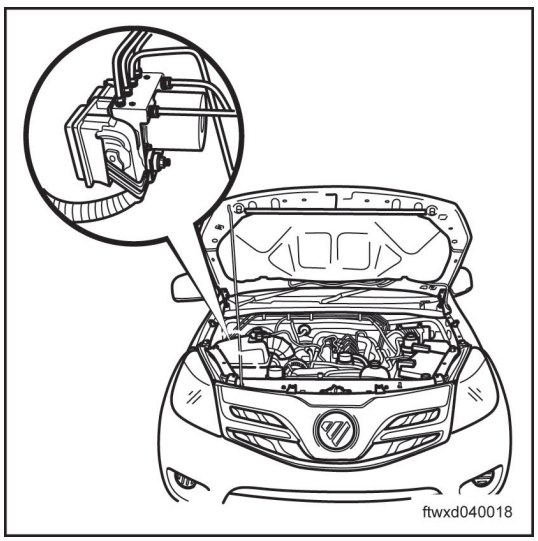
Connection of the multimeter	Standard value
Fuse F15-ground	Battery voltage
Fuse F15-ground	

Check whether the result is normal?

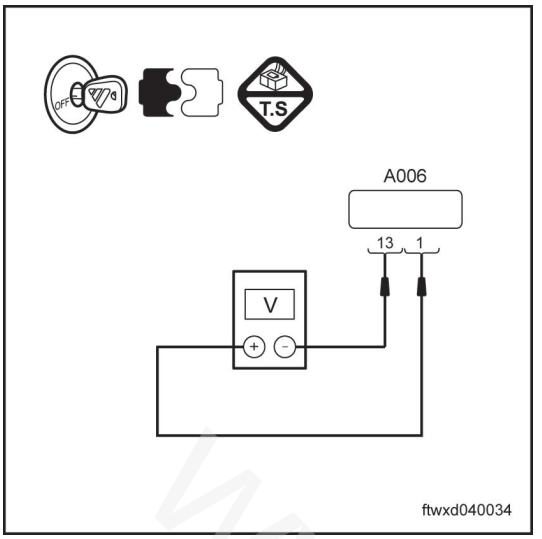
Yes> go to step 2

No > The voltages of both ends of the fuse are different, go to step 3.

2 . Check the connector of the ABS control module.



(a) disconnect the connector A006 of the ABS module.



(b) Measure the voltage between the pin 1 and pin 13 of the connector A006 of ABS control module.

Standard voltage

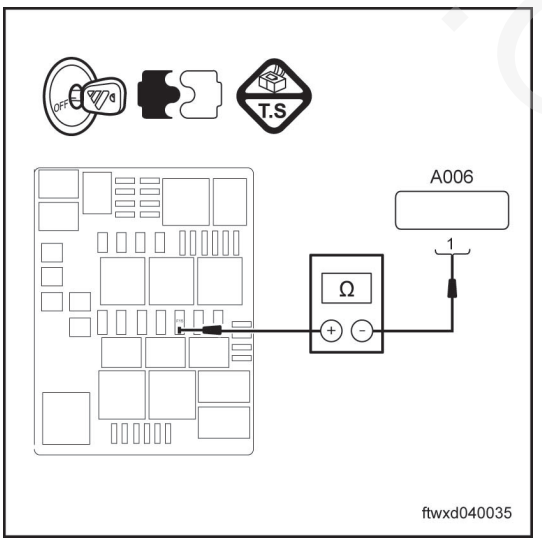
Connection of the multimeter	Standard value
A006（1）-A006（13）	Battery voltage

Check whether the result is normal?

Yes >Maintain or change the ABS control module.

No> go to step 3

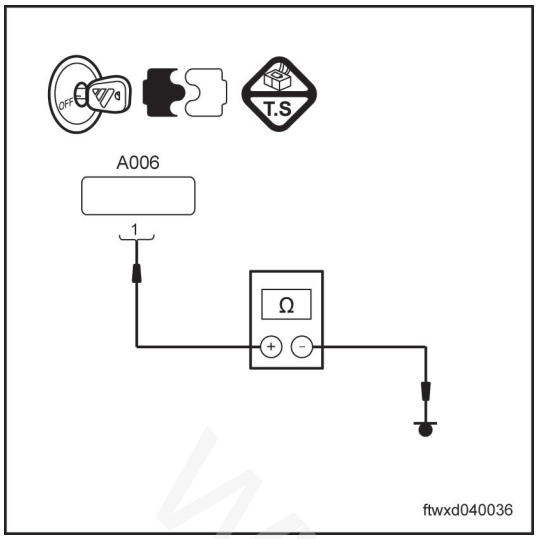
3 . Check the harness（indoor fuse box-ABS control module)



(a) Pull out the fuse F15 and measure the resistance value between the output end of fuse and the pin 1 of the connector A006 of ABS control module.

Standard electrical resistance (check whether there existent an open circuit)

Connection of the multimeter	Standard value
A006（1）-F15	＜2Ω



(b) Measure the resistance value between the pin 1 of the connector A006 of ABS control module and ground.

Standard resistance (check whether there is short circuit)

Connection of the multimeter	Standard value
A006（1）- ground	⩾ 1 MΩ

04

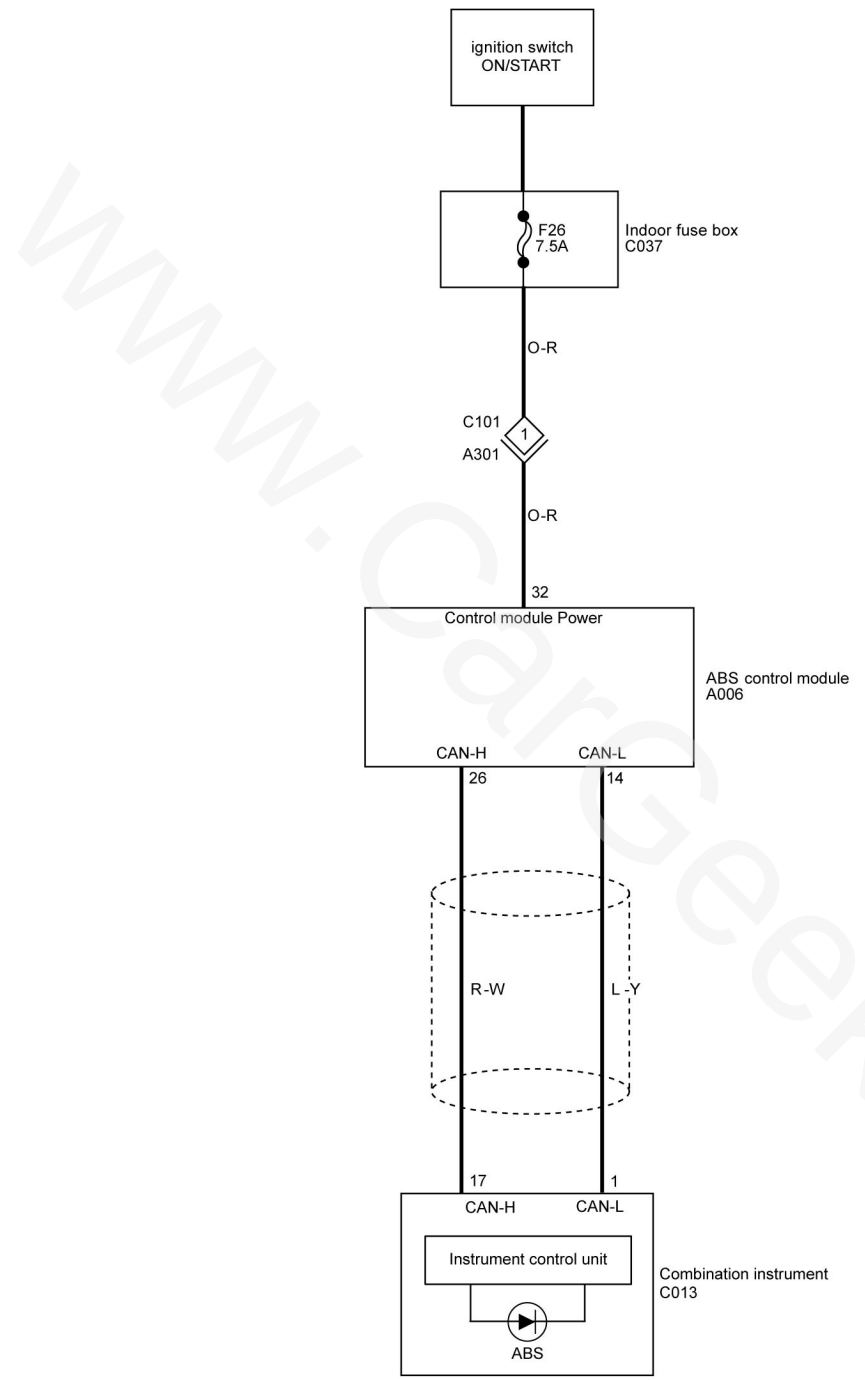
Check whether the result is normal?

Yes > Change the fuse F15 （40A）inside the vehicle-body fuse box.

No > Maintain or replace the harness and connectors

ABS INDICATING LAMP IS ALWAYS ON.
ABS INDICATING LAMP IS NOT BRIGHT

Circuit Diagram



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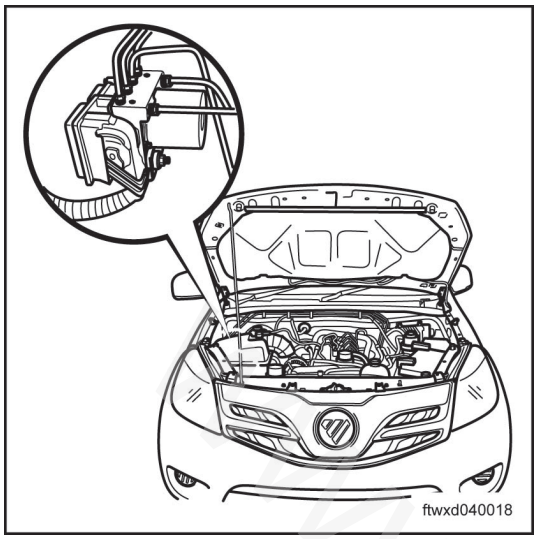
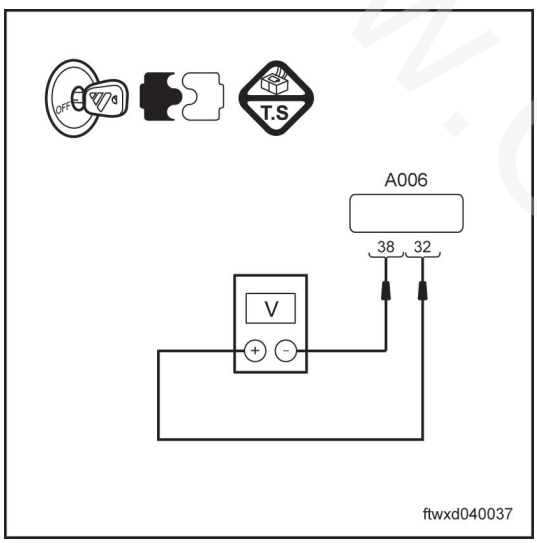
Diagnostic step

1 . Check the power supply of combination instrument



(a) disconnect the connector A006 of the ABS module.



(b) Turn on the ignition switch and measure the voltage between the pin32 and pin 38 of the connector C006 of ABS control module.

Standard voltage

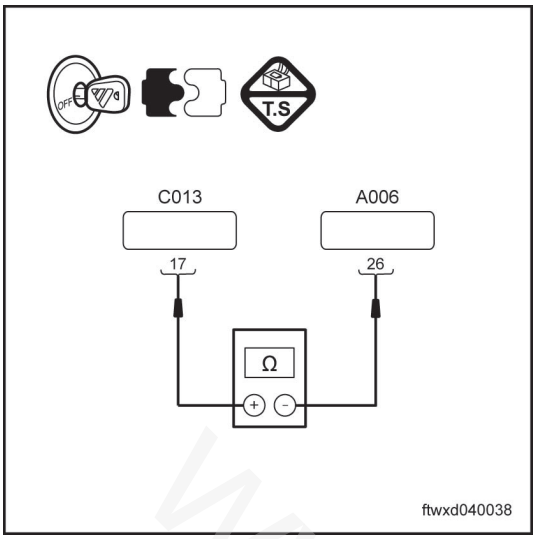
Connection of the multimeter	Standard value
A006（32）-A006（38）	Battery voltage

Check whether the result is normal?

Yes> go to step 2

No > Maintain or replace the harness or the connectors

2 . Check the harness

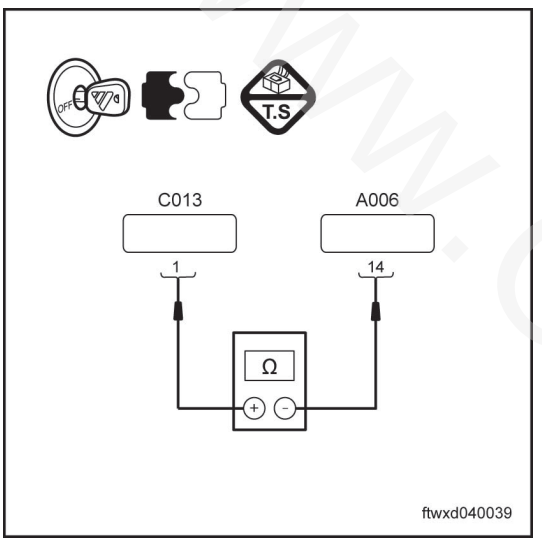


(a) Turn off the ignition switch and disconnect the connector C 13 of the combination instrument.

(b) Measure the resistance between the no.17 pin of connector C013 of the combination instrument and the no.26 pin of the connector A006 of ABS control module.

Standard resistance

Connection of the multimeter	Standard value
C013（17）-A006（26）	＜2Ω



(c) Measure the resistance between the no.1 pin of connector C013 of the combination instrument and the no.14 pin of the connector A006 of ABS control module.

Standard resistance

Connection of the multimeter	Standard value
C013（1）-A006（14）	＜2Ω

Check whether the result is normal?

Yes > Maintain or replace the combination instrument.

No > Maintain or replace the harness and connectors

ENGINE CONTROL SYSTEM

PRECAUTION

1 . Disconnect the Power Supply

- When disassembling or installing any electric unit, or touching the exposed electrical terminal with tools or devices, disconnect the negative battery cable firstly, and connect the negative battery cable at last so as to avoid personal injury or damage to the vehicle.
- Turn off the ignition if not otherwise specified.

! DANGER

Before connecting or disconnecting the negative battery cable, do turn off the ignition switch and lighting switch (if not, the semiconductor element may be damaged)

i WARNING

If the vehicle is equipped with central console lock, don't leave the key inside the vehicle before disconnecting the negative battery cable, or it may automatically lock up.

2 . The daily odometer and clock of combination instrument may be zero-cleared once the combination instrument is dismounted or the negative pole of battery is disconnected.

! DANGER

The overall speedometer cannot be reset to zero.

3 . Disconnect negative cable of the battery can make the sound system lose the stored settings.

i WARNING

When reconnecting the negative cable of the battery, the sound system should be reset.

4 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

5 . Precautions for failure shooting of the engine control system

(a) It is strictly forbidden to disconnect the battery from the circuit when engine runs at high speed, so as to avoid transient overvoltage that may damage the ECM and sensors.

(b) To carry out electric welding on the vehicle body, the ECM power supply shall be disconnected firstly. Special attention shall be paid to that when repairing an element of the vehicle body which is close to the ECM or sensors.

(c) When terminal contact or mounted parts occur failure, the system might be returned to its normal state absolutely or temporarily when a questionable part is dismounted and remounted.

(d) Unless otherwise specified in test process, test ECM and sensors with high-resistance digital multimeter instead of pointer multimeter.

(e) Do not use a test lamp to test any electric apparatus connected to ECM.

(f) The positive and negative poles of battery must not be connected incorrectly, and the negative pole must be earthed (ground).

(g) ECM and sensors must be protected from moisture. It is not allowed to damage the sealing gland of ECM or sensors, and it is especially not allowed to rinse ECM and sensor with water.

(h) Countermeasures against damages to the computer by human-body static electricity: To test the ECM or replace a chip, the operator must earth his body (earth) by attaching one end of agrounding ground metal tape to his wrist and the other end to the vehicle body, so as to prevent the human-body static electricity from damage the computer.

(i) To determine the failure location, it is required to check the condition of the vehicle when a failure occurs. For example, conduct checks as per the diagnostic trouble code (DTC) output, and record the conditions before each connector is disconnected or any part is dismounted and remounted.

(j) Do dismount and remount the ECM, actuators and all independent sensors after the ignition switch are turned off, unless otherwise specified in the inspection procedures.

(k) If a dismounted and reassembled ECM, actuator or sensor is remounted, the system shall be checked for normal conditions when assembling is finished. Use special diagnostic instrument to check DTC

(l) Use a digital multimeter to check the ECM terminals of engine

- Connect a fine probe to the probe of digital multimeter.
- Connect the fine probe to the inside of each terminal (from the inside harness) of ECM, and measure the magnitude of voltage of the terminals with reference to the check list.

WARNING

- **When the ignition switch is set to ON and the connectors are disconnected during diagnosis, other system may store the DTC. When the job is finished, verify the failure codes of all systems. Delete any DTC if available. To connect or disconnect the connector, set the ignition switch to its "LOCK" (OFF) position.**
- **Do not insert the testing probe into the harness for testing, so as not to deteriorate the water-repellent property and lead to corrosion. Use special tools such as testing harness, harness connector or inspection connectors.**
- **To check ordinary (non waterproof) connectors when the harness connectors are connected, insert the probe from the harness; if the connector is too small for insertion of the testing probe (for example the ECM connector), do not conduct insertion barely.**
- **To conduct checks when the connector is not connected (check male terminals):**
  - Caution: The used testing probe must not lead to short circuit of connector terminals so as not to damage the interior circuits of ECM.
  - When the connector is disconnected, the system to be checked or other systems may store the trouble code.
- **To conduct checks when the harness connector is not connected (check female terminals):**
  - Use special tools designed for harness checks. Forced probe insertion may lead to poor contact.
  - When the connector is disconnected, relevant system to be checked or other systems may store the trouble code.
- **Short-circuit caused by incorrect terminal insertion may damage the harness, sensor ECM or other elements. Be careful!**
- **It is unnecessary to conduct checks as per the sequence listed in the check list.**
  - If the results of voltage are different from the standard value, check relevant sensors, actuators and harness, and repair or replace them when necessary.
  - When repair or replacement is finished, use a voltmeter to check the values over again, and verify whether or not the failure is eliminated.

(m) Use a multimeter to check the resistance and conduction between the ECM terminals

- Ignition Switch: OFF.
- Remove the connectors of ECM harness.

- As per the check list, measure and check the resistance and conduction between the terminals of harness-side connectors of ECM.

WARNING

- **Use special-purpose check lines instead of ordinary test bars to measure the resistance and conduction between the terminals, so as not to affect the contact pressure of terminals.**
- **It is unnecessary to conduct checks as per the sequence listed in the check list.**
- **To check the resistance and conduction between the terminals, incorrect terminal insertion or incorrect short-circuit groundinggrounding (ground) of connector terminals may possibly damage the vehicle-body harness, sensors, ECM or multimeter, be careful!**
  - If the tested results are different from the standard value, check relevant sensors, actuators and harness, and repair or replace them when necessary.
  - When repair or replacement is finished, check the values over again, and verify whether or not the failure is eliminated.

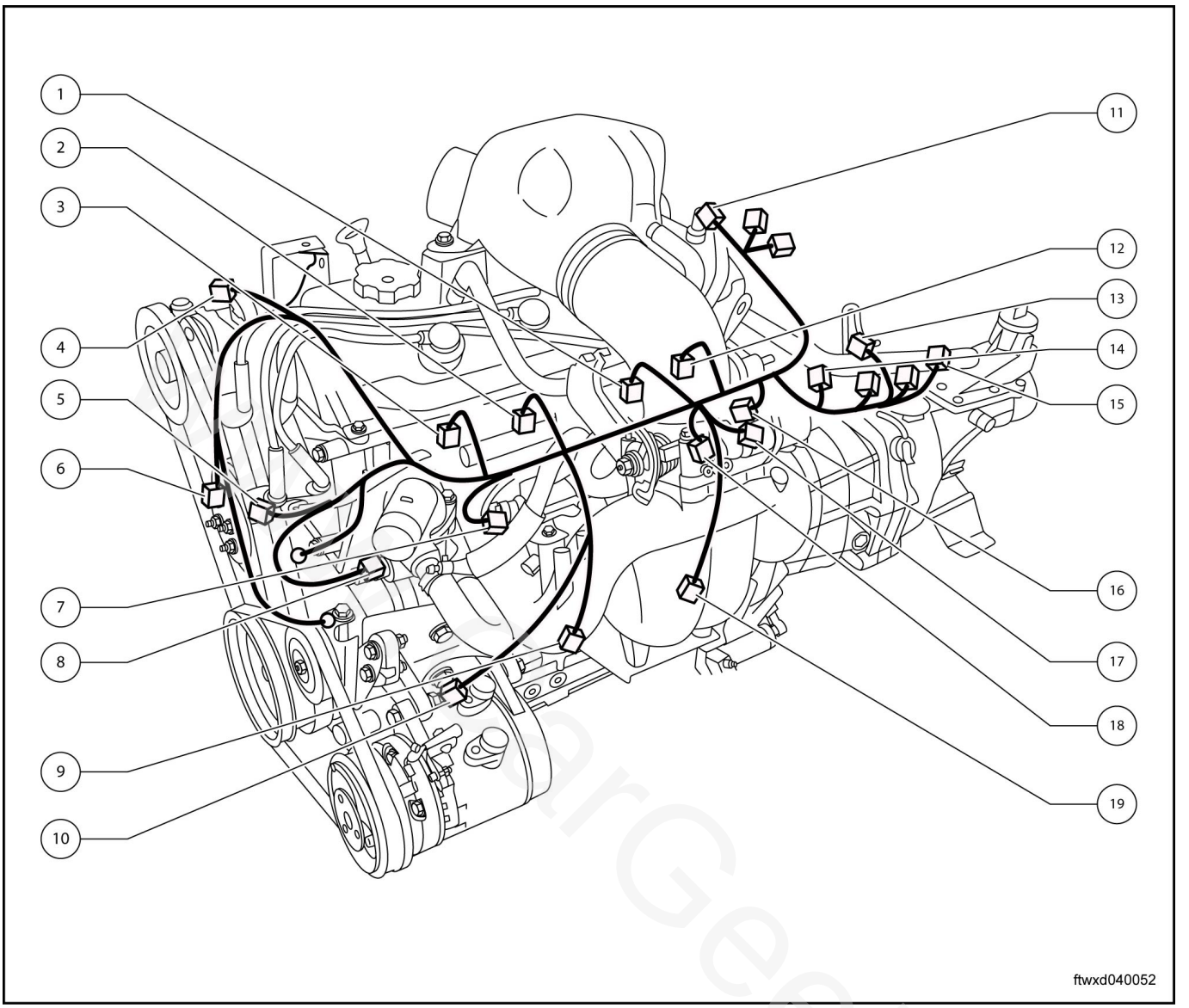
(n) Grounding (ground) checks

- Remove the grounding bolt or screw.
- Check all mating surfaces for blemish, soil and rust etc.
- Clean them as necessary so as to ensure good contact.
- Remount the bolts or screws securely.
- Check for any "additional" accessories that may interfere with the grounding circuit.
- If multiple conductors are press-bonded to 1 grounding hole, check it for correct press bond. Verify that all circuits are cleaned, secured and earthed properly. If multiple strands of electric wires are fitted to 1 grounding hole, verify that there is no grounding (earth) wire with too long insulating sheath.
- To replace the ECM, conduct adequate diagnosis of other causes since ECM is an expensive product with high reliability and cannot be damaged in most cases.

WARNING

- **Grounding connection is extremely important for normal operation of the electric and electronic circuits. The grounding connection is usually exposed to moisture, soil and other corrosive chemicals. Additional resistance may be generated in the eroded (rusted) places. The said additional resistance may change the working properties of the circuits.**
- **The electronic control circuits are extremely sensitive to the correctness of grounding, and loose or corroded grounding may have a strong impact on the electronic control circuits. Poor grounding or corrosion may easily affect the circuits. The earthed place may be covered by a layer of thin rust even though it appeared clean.**

COMPONENTS



1	Nozzle B
2	Nozzle D
3	Nozzle A
4	Power Steering Switch
5	Ignition Coil
6	Generator
7	Canister Solenoid Valve
8	Sensor Unit, Water Temperature
9	Knock Sensor
10	Compressor

11	Engine Control Unit
12	Nozzle B
13	Oil Pressure Warning Switch
14	CKP Sensor
15	Wheel Speed Sensor
16	Absolute pressure / temperature sensor, intake manifold
17	Stepping Motor
18	TPS
19	Starter

HOW TO CONDUCT FAILURE ANALYSIS

⚠ **CAUTION**

Use a diagnostic apparatus to diagnose a vehicle

1 . Send a vehicle to a maintenance depot.

Yes > Go to the next step.

2 . Collect and analyze the failure phenomena described by the customer.

Yes > Go to the next step.

3 . Connect the diagnostic apparatus to DLC.

Yes > Go to the next step.

4 . Check the DTC and still data.

Yes > Go to the next step.

5 . Clear the DTC and still data.

Yes > Go to the next step.

6 . Conduct visual check.

Yes > Go to the next step.

7 . Verify the failure phenomena.

Results (if the engine fails to start up, conduct the following "check for DTC" and basic inspection)

Result	Go to
The failure does not occur	The next step
The failure occurs	Step 9

8 . Simulation Symptom Test

Result	Go to
The failure does not occur	Step 11
The failure occurs	The next step

9 . Check for DTC.

Results

Result	Go to
Failure code occurs	The next step
No failure codes occur	Step 11

10 . Refer to the DTC list.

Yes > Go to Step 13.

11 . Conduct basic inspection.

Results

Result	Go to
The faulty component cannot be identified	The next step
The faulty component can be identified	Step 16

12 . Refer to the list of failure phenomena

Results

Result	Go to
The faulty component cannot be identified	The next step
The faulty component can be identified	Step 15

13 . Check the power supply circuit of ECM.

Yes > Go to the next step.

14 . Check the circuit.

Results

Result	Go to
The faulty component cannot be identified	The next step
The faulty component can be identified	Step 17

15 . Check for the intermittent failure.

Yes > Go to Step 17.

16 . Check the components

Yes > Go to the next step.

17 . Verify the failure.

Yes > Go to the next step.

18 . Adjust or repair

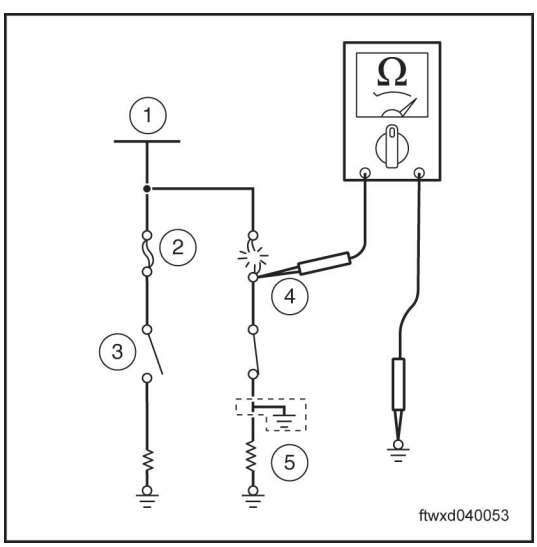
Yes > Go to the next step.

19 . Conduct a confirmation test.

Yes> Complete

Main points for inspection and maintenance if fuse is blown out

The failure code may be stored since the fuse is blown out.



Remove the blown-out fuse, and measure the resistance between the load side of the blown-out fuse and the ground. Turn off all switches connected to the circuit where the said fuse stays. If the resistance measured at this moment approximates to 0, a short-circuit must occur in some places

of the switches or loads. If the resistance is not 0, no short circuit exist at this moment; however, transient short circuit may cause fuse burn-out.

Major factors leading to short circuits are listed as follows:

- **Harness is nipped up by the vehicle body**
- **Sheath of the harness is damaged due to wear or heat**
- **Water enters into the connecters or circuits**
- **Human errors (mal-operation short circuit etc.)**

1	Battery
2	Fuse
3	Load switch
4	Fuse burn-out
5	Short circuit occurring position

INTERMITTENT FAILURE

If an intermittent failure exists, diagnosis may be conducted as per the following steps:

WARNING

In many cases, intermittent failure may be eliminated by itself (the functions of a part or circuit return to normal when no intervention is implemented). The phenomenon complained by the customer might not reoccur when DTC is tested. In addition, the most common causes of intermittent failures usually lie in the poor electric connectors. Therefore, the state in which the failure occurred is not very clear. So, the circuit check, which is part of the standard diagnosis steps, may fail to find out the specific failure zones.

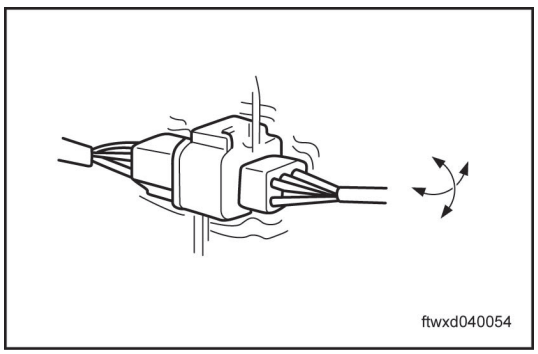
In such a case, we have to inquire the customer for the condition when the failure happened, inquire the vehicle owner for the driving details, weather condition, occurrence frequency and failure phenomena, carry out analysis, simulate the identical or similar condition and environment in which the failure happened, and then verify whether or not the failure phenomena were caused by vibration, temperature or other factors.

No matter how the serviceman is experienced and skillful, some important factors will certainly be ignored in process of repair if failure is analyzed without verification, and incorrect guesses may urge the personnel to take a wrong path, or even the repair cannot be carried out.

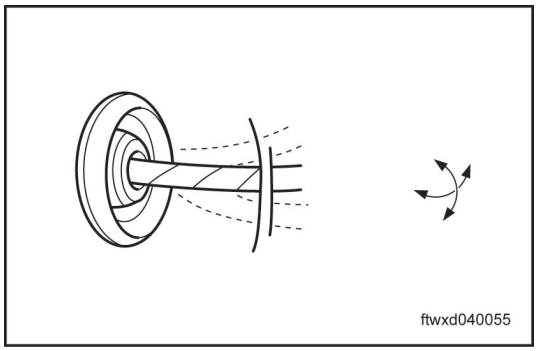
The following checks may be conducted to find out such failures.

1 . Vibration method.

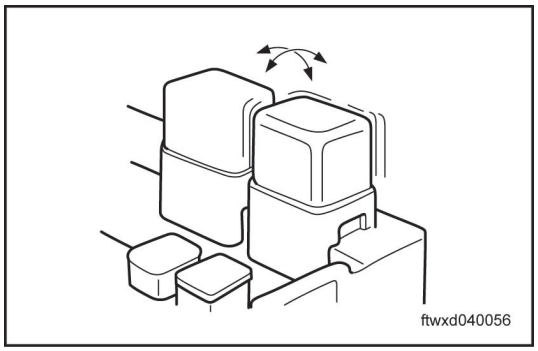
When vibration is considered as the major cause of the failure, the connectors and subassemblies may be checked so as to verify whether or not the failure phenomena occur. Failure simulation may be performed as per the following procedures:



(a) Connector: Shake the connectors gently in vertical and horizontal directions, and check whether or not the harness connectors connected to corresponding parts get loose. Check the terminals for soil, rust, corrosion, and bend. Check for any loose contact caused by elongation of terminals.



(b) Harness: Shake the harness gently in vertical and horizontal directions, and check thoroughly connections of the vibrated connectors and the harness inside the engine/ driver's cabin instruments for disconnected harness.



(c) Relay: parts and sensors: Pat the sensors, relays, or parts which are considered as the source of failure, and check them for malfunction. However, do not beat the relays violently for fear of open circuit of the relays.

2 . Heating method.

If a questionable zone is considered as the source of failure, use a hairdryer or similar device to heat the most probable components that may cause the failure, and check whether or not the failure occurs.

WARNING

The heating up temperature shall not exceed 60℃ (the heating temperature of components shall allow free touch). Do not heat up the electronic control modules.

3 . Water spray method.

If the failure is considered to occur in rainy days or moist weather, spray water onto the vehicle and check for any failure.

WARNING

- **Do not spray water onto the engine directly. Water shall be sprayed onto the front side of the radiator so as to change the temperature and humidity indirectly.**
- **Do not spray water directly onto the electronic elements.**
- **Do be careful to conduct water spraying on vehicle in which water leak exists, since the water leak may possibly damage the ECM.**

4 . Overall electric apparatus power-on method.

If the failure was possibly caused by too high electric load, power on all electric loads including the central heating blower, headlights and rear window defroster, and check whether or not the failure occur.

During the simulation test of failure phenomena, not only the phenomena shall be identified, but also the faulty location or faulty parts shall be found out. For this reason, the range of circuits (in which the failure might occur) shall be reduced as per the failure phenomena before the test is conducted and the tester is connected in advance. Then phenomenon simulation test may be conducted so as to determine whether or not the tested circuits are normal.

In case of failures that are hard to be handled, the list of troubleshooting and diagnosis codes may be utilized to conduct failure analysis/diagnosis so as to reduce the range of failure and find out the failure location quickly. The said method is considered as fairly practical and effective.

5 . Diagnostic apparatus data-stream freezing method.

Use the data stream capturing function of diagnostic apparatus. Simulate the failure conditions as per the frozen failure data recorded by the diagnostic apparatus when people read the data stream displayed by the diagnostic apparatus.

6 . Oscilloscope method.

Oscilloscope may be used to capture the waveforms such that the intermittent failures may be found out quickly.

7 . Other methods.

Part replacement method. To replace ECM or other control modules, conduct adequate diagnosis of other external causes since ECM is an expensive product with high reliability.

WARNING

To conduct part-replacement check of a control unit that might be damaged, the said control unit shall be mounted onto a failure-free vehicle and subjected to tests. The new control unit must not be mounted onto a faulty vehicle and subjected to relevant tests so as not to damage the control unit.

BASIC INSPECTION

If the failure cannot be identified through DTC check, failureshooting analysis shall be conducted for all circuits that might cause the failure. In most cases, the faulty position may be quickly found out by conducting the basic inspections of engine shown in the following process chart. Therefore, it is extremely necessary to adopt such a test method to eliminate the engine failures.

1 . Check battery voltage

WARNING

The check shall be conducted when the engine is shut down or the ignition switch is set to its OFF position.

Results

Result	Go to
11V or higher	The next step
Lower than 11V	Recharge or change the battery

2 . Check whether or not the engine can be started up.

Check whether the result is normal?

Yes > Go to the next step.

No > Go to the list of failure phenomena

3 . Check the air filter.

Is the result normal (whether or not containing dust, soil or oil)?

Yes > Go to the next step.

No > Replace or clean the filter.

4 . Check the idle speed.

Check whether the result is normal?

Yes > Go to the next step.

No > Go to the list of failure phenomena

5 . Check the fuel pressure.

Check whether the result is normal?

Yes > Go to the next step.

No > Exclude the failure of fuel pressure; go to the next step.

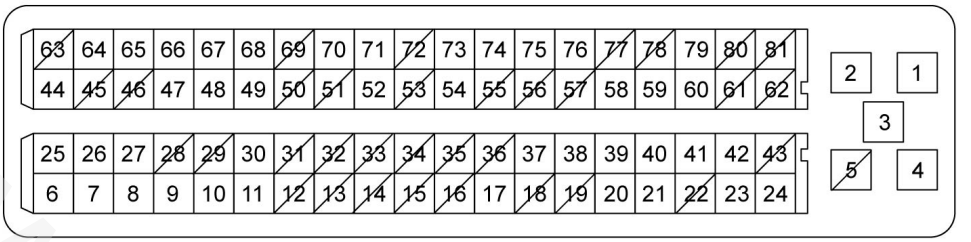
6 . Check the ignition.

Check whether the result is normal?

Yes > Go to the next step.

No > Exclude the ignition system.

CONFIGURATION DIAGRAM OF ECM-SIDE TERMINALS



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Terminal no.	Terminal definition	Color	Inspection Condition	Normal state
1	Ignition Coil B	Blue		
2	Earthing	Black		
3	Earthing	Black		
4	Ignition coil A	Green		
5				
6	Nozzle A (1-cylinder)	Blue - white		
7	Nozzle B (4-cylinder)	Blue - pink		
8	Nozzle D (3-cylinder)	Blue - purple		
9	Fuel pump relay control	Purple		
10	A/C grant signal	Yellow - green		
11	Crankshaft position signal (low)	Pink		
12				
13				
14				
15				
16				
17	High-speed electronic fan control	Purple - yellow		
18				
19				
20	Idle-speed control valve A (high)	Green - brown		
21	Idle-speed control valve A (low)	Green - yellow		
22				

Terminal no.	Terminal definition	Color	Inspection Condition	Normal state
23	Heater of rear oxygen sensor	Blue - black		
24	Heater of front oxygen sensor	Blue - red		
25	Nozzle C (2-cylinder)	Blue - orange		
26	Medium voltage switch signal	Brown - red		
27	TPS	Purple - green		
28				
29				
30	Crankshaft position signal (high)	Orange		
31				
32				
33				
34				
35				
36				
37	Knock Sensor	Orange - purple		
38	CAN L	Red - white		
39	CAN H	Blue - yellow		
40				
41	Idle-speed control valve B (high)	Yellow - pink		
42	Idle-speed control valve B (low)	Brown - yellow		
43				
44	Main relay control	Pink		
45				
46				
47	Front oxygen sensor signal	White		
48	Rear oxygen sensor signal	White - black		
49	Sensor unit, water temperature V5 -	White - red		
50				
51				
52	Sensor Unit, Water Temperature	White - black		
53				
54	Intake pressure sensor	Blue - yellow		
55				
56				
57	Clutch switch			
58	Knock sensor V5 -	Black - white		

Terminal no.	Terminal definition	Color	Inspection Condition	Normal state
59	Acceleration sensor signal	Brown - green		
60	Power steering switch input	Black - yellow		
61				
62				
63				
64	Canister Solenoid Valve	White - yellow		
65	Low-speed fan control	Yellow - purple		
66	Intake pressure sensor V5	Sky blue		
67	Electric power supply 12V	Red - yellow		
68	IG power supply	Light green		
69				
70	Throttle position sensor V5	Brown		
71	Intake Temperature Sensor	Blue - white		
72				
73	Oxygen sensor (ground)	White - pink		
74	Throttle position sensor V5 -	Yellow - black		
75	K line	Gray - pink		
76	Intake temperature sensor V5 -	Brown - red		
77				
78				
79	A/C request signal	Orange - purple		
80				
81				

DIAGNOSIS SYSTEM

1 . Failures of engine electric control system may be divided into 2 types:

(a) One type is to light up the MIL lamp (OBD failure indicating lamp), indicating the emission control failure and limp mode of the system. Once the MIL lamp of instrument goes on, immediate treatment shall be performed as per relevant national laws and regulations. Otherwise the system may limit the fuel injection and speed of the engine so that the normal use of vehicle may be affected.

(b) The other type may have the SVS failure indicating lamp lit up, which indicates that the electric control system develops a fault that shall be repaired in time.

(c) For the both types of failures, failure diagnostic apparatus or special equipment designed for corresponding functions shall be used to conduct corresponding checks.

2 . Light-up of SVS lamp and MIL lamp are under the control of ECM. Detailed light-up of SVS and MIL lamps before and after startup is described below:

- When the system is failure free and the ignition switch is set to its ON position, the MIL lamp and the SVS lamp will go on (system self-check); neither the SVS lamp nor MIL lamp goes on after startup and engine stall.
- When the system is faulty and the ignition switch is set to its ON position, the MIL lamp and the SVS lamp will constantly go on (system self-check); After startup, if the SVS lamp is defined as - ON mode in the failure categories, the SVS lamp may constantly go on when the SVS lamp -ON conditions are satisfied.If the MIL lamp is defined as - ON mode in the failure categories, the MIL lamp will constantly go on when the MIL lamp- ON conditions are satisfied. When the ignition switch is set to it OFF position after engine stall, the both lamps go out when the AFTERRUN process (90s at most) expires.

3 . To diagnose and exclude an engine failure that might relate to the electric-control fuel injection system, it is required to judge whether or not the failure relates to the electric-control fuel injection system firstly. If the engine is faulty while the failure indicating lamp does not go on, the failure may not relate to the electric control system in most cases.

(a) Relevant failure code record and data stored in the ECM, which are related to the sensors and actuators, may be read by diagnostic apparatus KT600. In addition, actuator may be compulsorily driven by the diagnostic apparatus under specific conditions.

(b) DLC- data interlink connector.

Terminal no.	Name
4	Earthing
5	Earthing
6	CAN_H
7	Diagnostic communication K
14	CAN_L
15	LIN
16	Battery power supply

READING AND CLEARANCE OF THE DIAGNOSTIC TROUBLE CODE (DTC)

⚠ CAUTION

Failures are detected by the engine control system and stored in the engine control module (ECM), and the system failures may be current or historic ones.

1 . Current failures: It refers to the failures currently existing in ECM, for example: open circuit of engine coolant temperature sensor. The current failures must be repaired; otherwise, they cannot be cleared from the memory.

2 . Historic failures: They may be stored in 2 modes:

- The failures had been repaired, the actual failures do not exist, however the memorized data are not cleared from ECM.
- Failures had occurred but do not exist presently, however, they might reoccur. For example: poor contact of harness. Since the stored failures are not the present failures, they require no repair before they are cleared from the memory, or they may be handled as per the elimination of intermittent failures.

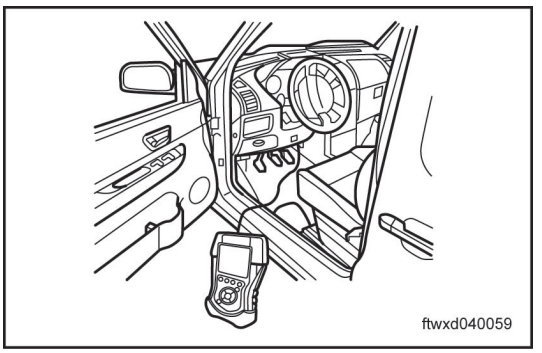
⚠ CAUTION

- **If the battery voltage is too low and the testing codes of ECM cannot be output normally, the battery voltage must be detected before the check, and the voltage shall not be lower than 11V.**
- **When the battery or ECM connector is disconnected, the failure codes stored in ECM may be cleared.**
- **Before the KT600 intelligent diagnostic apparatus is connected or disconnected, the ignition switch must be set to its OFF (LOCK) position.**

⚠ CAUTION

Use a special-purpose test tool to read the engine failure codes: KT600 comprehensive intelligent diagnostic apparatus.

Use a diagnostic apparatus to perform DTC reading procedures.



1 . Check and ensure the following conditions:

- Throttle is completely closed.
- Air conditioner switch is set to its OFF position.
- Transmission is set to its neutral gear.

2 . Switch off the ignition.

3 . Connect the analyzer to the diagnostics connector (16-pin) at the lower left of the dashboard.

4 . Switch on the ignition and the analyzer - use the latest software version.

5 . Select menu items:【Beiqi Foton】-【pick-up】-【Tunland】-【engine】-【4G69 gas-engine】-【Delphi system】-【MT22.1.1】-【read the current code】.

6 . Check, record and delete the DTC and data stream (in case DTC cannot be deleted, implement diagnostic steps as per "the check list of failure codes", and repair the failure).

7 . Start the engine until it reaches normal working temperature.

8 . Run the engine till MIL goes on in one of the following conditions:

- Simulated preset conditions of DTC.
- Simulated failure conditions described by customer.
- Simulated still data status read by diagnostic apparatus.

9 . Use a diagnostic apparatus to read the DTC recorded by ECM.

10 . If DTC records are available while data or functions are normal, refer to the Diagnostic help – Elimination methods for intermittent failures; If DTC records are available while data or functions are abnormal, implement diagnostic steps as per "check list of failure codes" and repair the failure.

⚠ CAUTION

- **Use a diagnostic apparatus to read and capture the data. Once DTC is stored, ECM may record the information about the vehicle and driving conditions as still data. To eliminate the failures, the data capturing function may help determining whether or not the vehicle is running or stopped when the failure occurred, whether or not the engine is warm, whether or not the air-fuel ratio is too low or too high, and other data.**
- **Preset conditions of DTC include, but not limited to the following:**

(a) Engine speed.
(b) Vehicle speed.
(c) Engine coolant temperature sensor.
(d) Intake-manifold absolute pressure / temperature sensor.
(e) Atmospheric pressure sensor.
(f) Intake temperature sensor.
(g) Throttle position.
(h) Canister discharge.
(i) Fuel adjustment
(j) Air conditioner (A/C) switch.

Failure code clearing methods

1 . Switch off the ignition.
2 . Connect the analyzer to the diagnostics connector (16-pin) at the lower left of the dashboard.
3 . Switch on the ignition and the analyzer - use the latest software version.
4 . Select menu items:【Beiqi Foton】-【pick-up】-【Tunland】-【engine】-【4G69 gas-engine】-【Delphi system】-【MT22.1.1】-【clear trouble code】.

CAPTURED DATA

WARNING

- **DTC - Once DTC is stored, ECM may record the information about the vehicle and driving conditions as still data. To eliminate the failures, the still data may help determining whether or not the vehicle is running or stopped when the failure occurred, whether or not the air-fuel ratio is too low or too high, and whether or not other data are recorded.**
- **If a failure cannot recur even if DTC is detected, the still data have shall be verified. ECM may record the engine conditions at intervals as still data. Diagnostic apparatus may be used to read a certain groups of still data, since KT600 diagnostic apparatus is provided with powerful help functions designed for random data stream. In the engine system 4G69, select the data stream reading function menu to access the data stream test result display interface, click ? the "Help" button, and the following window pops up:**
  - Driving record playback.
  - Calculator.
  - Data area reference.
  - Data capturing.
  - Data comparing
  - Relevant data stream setup.
  - Data/waveform display.
  - Traveling recorder menu.
- **These data may be used to simulate the vehicle conditions when the failure occurred. They may help determine the source of failure, and judge whether the failure falls within transient failures.**

LIST OF FAILURE PHENOMENON PROTECTIONS

When the self-diagnosis function of engine control system detects that the main sensor fails to work, the vehicle may be controlled by a preset control logic loop once a DTC is set up, such that the vehicle may run safely. In addition, the following phenomena may occur when the sensor or actuator fails to work:

Sequence number	Trouble items	Control contents during failure
1	Injector	• Failure signal lamp goes on • Idle speed gets unstable • Engine gets powerless • Engine startup gets hard • Acceleration performance gets poor
2	Relay	• Failure signal lamp goes on • System fails to work • Engine cannot be started up
3	Fuel pump	• Failure signal lamp goes on • Noises are heard when fuel pump works • Acceleration performance gets poor • Engine cannot be started up
4	Ignition Coil	• Failure signal lamp goes on • Oil injection into corresponding cylinder is stopped • Target idle speed is raised • Idle speed gets unstable • Engine gets powerless • Fuel economy gets poor • Emission exceeds standard • Ignition gets weak
5	Oxygen sensor	• Failure signal lamp goes on • System postpones the closed ring working time • Fuel economy gets poor • Emission exceeds standard • Acceleration gets slow • Driving force gets weak
6	Canister Solenoid Valve	• Failure signal lamp goes on • Canister solenoid valve is turned off • System turns off the self-learning of basis fuel control closed ring • System turns off the self-learning of idle speed air control • Idle speed gets unstable or higher
7	Knock Sensor	• Failure signal lamp goes on • Safe ignition advance angle is adopted • Engine knocking occurs • Engine is overheated • Emission exceeds standard

Sequence number	Trouble items	Control contents during failure
		• Fuel economy gets poor • Drive • Interior destructive force of engine gets weak/poor
8	Wheel Speed Sensor	• Failure signal lamp goes on • Driving restriction measures might be taken • Instrument does not display vehicle speed • Fuel economy gets poor
9	Intake Temperature Sensor	• Failure signal lamp goes on • Intake temperature is equal to the coolant temperature
10	CKP Sensor	• Failure signal lamp goes on • Engine cannot be started up • Speed is restricted after the engine is started up • Maximum engine speed is not higher than approximately 4000RPM • Emission exceeds standard • No ignition signals are sent to ECM • tachometer fails to work • Noisy engine
11	TPS	• Failure signal lamp goes on • At idle speed, the opening of throttle position sensor may be set to 0%. At other speeds, the opening of throttle position sensor may vary as per the speed. • Fuel injection-quantity cannot be increased when acceleration, so the acceleration performance gets poor.
12	Absolute pressure / temperature sensor, intake manifold	• Failure signal lamp goes on • Intake temperature is adopted when the engine is started up, and the value is fixed when time increase progressively to a certain one. • Engine startup gets hard in cold-vehicle state • Engine startup gets hard in warm-vehicle state • Driving force gets weak • If engine coolant temperature sensor circuit and power supply is short-circuited, the engine may work at the default values • Cooling fan continuously works at high speed • The high temperature warning lamp flickers when high temperature is displayed in the instruments

LIST OF DATA STREAMS, MOTION TEST

1 . List of data stream

⚠ CAUTION

- **The data list displayed on the diagnostic apparatus may be read, and the data values of parts including switches, sensors and actuators nay be checked without removing any parts. Data list reading is conducted as the first step for troubleshooting such that the diagnosis time may be reduced.**
- **Data under normal conditions are given in the table below (for reference only). Never judge whether or not a part gets faulty only as per these reference values.**

Steps to read data list:

(a) Start up the engine, and allow it to run till it reaches its normal working temperature.
(b) Switch off the ignition.
(c) Connect the analyzer to the diagnostics connector (16-pin) at the lower left of the dashboard.
(d) Switch on the ignition and the analyzer - use the latest software version.
(e) Select the following menu items:【Beiqi Foton】-【pick-up】-【Tunland】-【engine】-【4G69 gas-engine】-【Delphi system】-【MT22.1.1】-【read the data stream】.
(f) Refer to the following table and check the data. The following table gives the values of tested items under different conditions within the “data stream reading” item observed by using KT600 diagnostic apparatus.

- If no specific idle speed status is indicated, the transmission shift lever of transmission shall be set to its neutral position, and the air conditioner switch and all accessory switches shall be set to their OFF positions.
- Fuel injector drive time indicates the period of time when the crankshaft speed is lower than 2500RPM and the supply voltage is 11V.
- For new vehicles (driving mileage is less than 500km), the drive time of fuel injector may be longer than standard time by 10%.
- For new vehicles (driving mileage is less than 500km), the step length of step motor may be 3 step length longer than standard step length.

Analyzer Item	Checked items (range)		Normal Condition
Oxygen sensor	• Engine: warming-up status • Air-fuel ratio: getting lower when deceleration; getting higher when acceleration	**When reducing the engine speed from 4000RPM**	**≤200mV**
		Sudden acceleration	**600-1,000mV**
	• Engine: warming-up status • Use a oxygen sensor signal to check the air-fuel ration, and use ECU to check the controlled conditions	**Engine idling**	**≤400mV**
		At 2500RPM	**600-1,000mV**

Analyzer Item	Checked items (range)		Normal Condition
Intake Manifold Pressure Sensor	• Engine coolant temperature: 80 – 95℃ • Lighting and all accessories: OFF • Transmission: neutral gear	Engine idling	
		At 2500RPM	
		When engine is accelerated	
Intake Temperature Sensor	• Ignition: ON • Or engine: ON	Intake temperature: -20℃	-20℃
		Intake temperature: 0℃	0℃
		Intake temperature: 20℃	20℃
		Intake temperature: 40℃	40℃
		Intake temperature: 80℃	80℃
TPS	Ignition: ON	Idling Position	300~1000m
		Throttle valve opens gradually	Proportional increase with the throttle valve open angle
		Fully open	4500~5500mV
Power supply voltage	Ignition: ON		System voltage
Ignition switch	Ignition: ON	Engine: stopped	OFF
		Engine: Start the engine.	ON
ECT Sensor	Ignition switch: On or engine running	Intake temperature: -20℃	-20℃
		Intake temperature: 0℃	0℃
		Intake temperature: 20℃	20℃
		Intake temperature: 40℃	40℃
		Intake temperature: 80℃	80℃
Air conditioner (A/C) switch	Engine: idle speed (compressor works when A\C switch is set to ON position)	A/C switch: OFF	OFF
		A/C switch: ON	ON
Injector	Engine: rotating	Cooling temperature: 0℃	60 ～ 90 ms
		Cooling temperature: 20℃	30 ～ 5 ms
		Cooling temperature: 80℃	6.7 ～ 10.1 ms

Analyzer Item	Checked items (range)		Normal Condition
Injector	• Engine coolant temperature: 80 – 95℃ • Lighting and all accessories: OFF • Transmission: neutral gear	**Engine: idle speed**	**2.2 ～ 3.4 ms**
		2500RPM	**1.9 ～ 3.1 ms**
		Engine idles at high speed suddenly	**Increased**
Ignition coil and transistor	• Engine: warming-up status • Timing lamp: used (using the timing lamp is to test the actual ignition time)	**Engine idling**	**2 ～ 18 BTDC**
		2500RPM	**27 ～ 47 BTDC**
Idle Stepping Motor	• Engine coolant temperature: 80 – 95℃ • Lighting and all accessories: OFF • Gearbox: Neutral • Engine: idle speed • When A/C is on, A/C compressor shall work	**A/C switch: OFF**	**2-25 steps**
		A/C switch: OFF→ON	
A/C relay	**Engine: post-warming-up/idle speed**	**A/C switch: OFF**	**Unactivated (compressor clutch does not work)**
		A/C switch: ON	**Activated (compressor clutch works)**
CKP Sensor	• Engine: running • Tachometer: connected	**Compare the engine speed values that are read respectively from the tachometer and KT600**	**identical**
	Engine: idle speed	**Coolant temperature: -20℃**	**1275 ～ 1475 RPM**
		Coolant temperature: 0℃	**1225 ～ 425 RPM**
		Coolant temperature: 20℃	**1100 ～ 1300 RPM**
		Coolant temperature: 40℃	**950 ～ 1150 RPM**
		Coolant temperature: 80℃	**750 ～ 850 RPM**

2 . Motion test.

WARNING

Motion test may implement tests and other special operation learning for relays and actuators, and no parts have to be removed. Use a diagnostic apparatus to conduct motion test. Data list reading is conducted as the first step for troubleshooting such that the diagnosis time may be reduced.

Data list may be displayed when motion test is conducted.

(a) Connect the diagnostic apparatus to the trouble diagnostic connector (16-pin) located in the lower left side of the instrument panel.

(b) Switch on the ignition and the analyzer - use the latest software version.

(c) Select the following menu items:【Beiqi Foton】-【pick-up】-【Tunland】-【engine】-【4G69 gas-engine】-【Delphi system】-【MT22.1.1】-【motion test】.

(d) Conduct motion test with reference to the following table. The table below gives the “motion test” items by using KT600 trouble diagnostic apparatus.

(e) If any exception is detected when engine is checked by "motion test" functions, the harness or elements shall be repaired.

(f) When repair is finished, use KT600 diagnostic apparatus to conduct verification once again to confirm that the problem points had been solved.

(g) Clear the trouble code.

(h) Remove the KT600 diagnostic apparatus.

(i) Restart up the engine and conduct test, and confirm that the trouble is already eliminated.

Displayed by diagnostic apparatus	Tested parts	Control range	Diagnostic comments
Trouble indicator lamp	Trouble indicator lamp	ON/OFF	-
Carbon Canister	Canister solenoid valve control	ON/OFF	-
Fuel pump relay	Fuel pump relay	ON/OFF	-
Low-speed fan	Control the low-speed fan	ON/OFF	-
High-speed fan	Control the high-speed fan	ON/OFF	-
Air conditioner relay	A/C trip relay	ON/OFF	-
Idle-speed air control motor (stepping)	Control the number of steps of step motor	-	-
Idle-speed air control motor (speed)	Control the speed of step motor	-	-
Idle-speed air control motor (reset)	Control the resetting of step motor	-	-
Ignition Advance Angle	Control the ignition advance angle	-	-
Gear speed learning	58X learning	-	-
Injector (A/B/C/D)	Control the cylinder fuel cutoff	ON/OFF	-
BLM learning	-	-	-
BLM resetting	-	-	-
Fuel open loop control	Control the open loop	-	-
Idle-speed catalyzer monitoring	Idle-speed catalyzer monitoring	-	-
Oxygen sensor response	Oxygen sensor response	-	-

DTC LIST

⚠ **CAUTION**

When checking DTC in the checking model, if certain DTC is displayed, then the circuit of the code listed in the following list should be checked. The detailed description of each DTC can refer to corresponding pages.

Failure code	Diagnostic items (DTC definition)	Trouble location
P0106	Rationality failure of intake pressure / throttle position signals	• Intake Manifold Pressure Sensor • The pressure sensor connector of intake manifold is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0107	The Intake pressure sensor circuit is subjected to low voltage or disconnection.	• Intake Manifold Pressure Sensor • The pressure sensor connector of intake manifold is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0108	The Intake pressure sensor circuit is subjected to high voltage.	• Intake Manifold Pressure Sensor • The pressure sensor connector of intake manifold is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0112	Low voltage of intake temperature sensor	• Intake Temperature Sensor • The intake temperature sensor connector is subjected to poor contact, and the sensor harness is short-circuited • ECM
P0113	High voltage of intake temperature sensor	• Intake Temperature Sensor • The intake temperature sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0117	Low voltage of coolant temperature sensor circuit	• Engine coolant temperature sensor • The engine coolant temperature sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0118	High voltage of coolant temperature sensor circuit	• Engine coolant temperature sensor • The engine coolant temperature sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0122	Low voltage of throttle position sensor	• Failure or maladjustment of throttle position sensor

Failure code	Diagnostic items (DTC definition)	Trouble location
		• The throttle position sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0123	High voltage of throttle position sensor	• Failure or maladjustment of throttle position sensor • The throttle position sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0131	To-ground short-circuit of front oxygen sensor	• Front Oxygen Sensor • The front oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0132	To-power-supply short-circuit of front oxygen sensor	• Front Oxygen Sensor • The front oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0133	Slow-response failures of front oxygen sensor	• Front Oxygen Sensor • The front oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0134	Inadequate activity or open circuit of front oxygen sensor	• Front Oxygen Sensor • The front oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited • ECM
P0135	Heating failure of front oxygen sensor	• Heater of front oxygen sensor • The front oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited • ECM
P0137	To-ground short-circuit of rear oxygen sensor	• Rear Oxygen Sensor • The rear oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0138	To-power-supply short-circuit of rear oxygen sensor	• Rear Oxygen Sensor • The rear oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM

Failure code	Diagnostic items (DTC definition)	Trouble location
P0140	Inadequate activity or open circuit of rear oxygen sensor	• Rear Oxygen Sensor • The rear oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0141	Heating failure of rear oxygen sensor	• Heater of rear oxygen sensor • The rear oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0171	Fuel system is too thin	• Intake Air System • Fuel injector blocked • Manifold pressure sensor • ECT sensor • Pressure of the fuel system • Gas leak of exhaust system • The oxygen sensor harness is subjected to open circuit or short circuit • Oxygen sensor • Heater of oxygen sensor • Relay and harness • Air hose connection • Vent valve and hose • ECM
P0172	Fuel system is too thick	• Fuel injector leaking or blocked • Manifold pressure sensor • Sensor Unit, Water Temperature • Ignition System • Fuel pressure • Gas leak of exhaust system • The oxygen sensor harness is subjected to open circuit or short circuit • Oxygen sensor • Sensor heater • Relay and harness • ECM
P0201	Nozzle A circuit failure	• Injector A • Injector harness • ECM
P0202	Nozzle B circuit failure	• Injector B • Injector harness • ECM

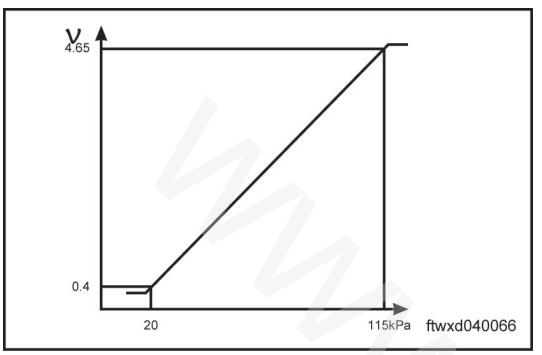
Failure code	Diagnostic items (DTC definition)	Trouble location
P0203	Nozzle C circuit failure	• Injector C • Injector harness • ECM
P0204	Nozzle D circuit failure	• Injector D • Injector harness • ECM
P0230	Fuel pump relay failure	• Relay • Fuel pump relay harness • ECM
P0300	Accident fire	• The engine control system harness is subjected to open circuit or short circuit • Connector connection • Vacuum hose connection • Ignition System • Injector • Fuel pressure • Manifold pressure sensor • ECT sensor • Compression pressure • Valve clearance • Valve mechanism timing • Vent valve and hose • Air hose connection • Intake Air System • ECM
P0325	Knocking control system failure	• Knocking sensor harness • Knock Sensor • ECM
P0336	Crankshaft position sensor circuit interfering signal	• The crankshaft position sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0335	No signals from crankshaft position sensor	• CKP Sensor • The circuit connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM
P0443	Carbon canister control valve failure	• The carbon canister control valve harness is subjected to open circuit or short circuit • Carbon canister control valve • ECM

Failure code	Diagnostic items (DTC definition)	Trouble location
P0480	Fan 1 failure	• Fan 1 • Fan 1 harness • ECM
P0481	Fan 2 failure	• Fan 2 • Fan 2 harness • ECM
P0650	Failure indicating lamp failure	• Trouble indicator lamp • Failure indicating lamp harness • ECM
P0685	Main relay output failure	• Main relay • Main relay harness • ECM
P1336	Need gear speed learning	• After replacing ECU or crank gear ring, or adjusting the relative position of the gear ring and the 58X sensor • The crankshaft position sensor connector is subjected to poor contact, and the sensor harness is open-circuited or short-circuited • ECM

DEFECT DIAGNOSTICS CODE (DTC) TEST (ENGINE CONTROL SYSTEM)

P0107 – INTAKE PRESSURE SENSOR CIRCUIT IS SUBJECTED TO LOW VOLTAGE

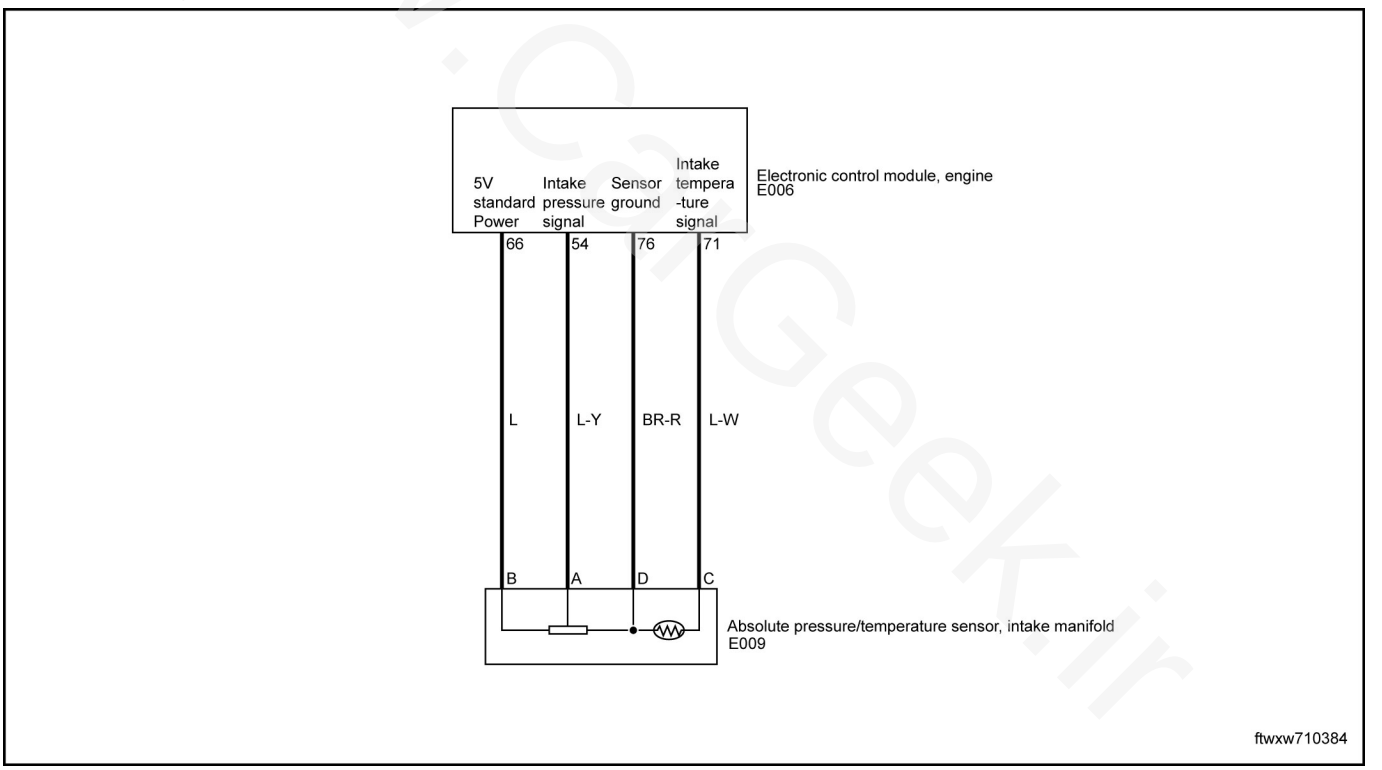
P0108 – INTAKE PRESSURE SENSOR CIRCUIT IS SUBJECTED TO HIGH VOLTAGE



Description

The system adopts speed-density-air metering method to detect the air quantity entering into the engine in order to control the fuel-injection pulse width and precisely control the engine power output.

Circuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0107	Low voltage of intake pressure sensor circuit	• Ignition: ON • No TPS defect • ECM detects that the MAP input signal is lower than the preset minimum value	• MAP sensor • Poor contact of the sensor connector • The sensor signal circuit is subjected to open circuit or high resistance • To-ground short circuit of sensor signal circuit • 5V reference voltage circuit is disconnected • Sensor ground wire is disconnected • sensor 5V reference voltage circuit and ground wire of the sensor is reversely connected (the defect may lead to damage of the sensor) • .ECM
P0108	The Intake pressure sensor circuit is subjected to high voltage.	• Engine: running • No TPS defect • ECM detects that the MAP input signal is higher than the preset maximum value	• MAP sensor • .Sensor signal circuit and 12V power supply are short-circuited • The 5V reference voltage circuit and 12V power supply of the sensor are short-circuited • ECM

⚠ **CAUTION**

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **Engine fails to run when ignition switch is set to ON, and the manifold pressure is equivalent to the atmospheric pressure. In addition, the sensor signal outputs high voltage.**

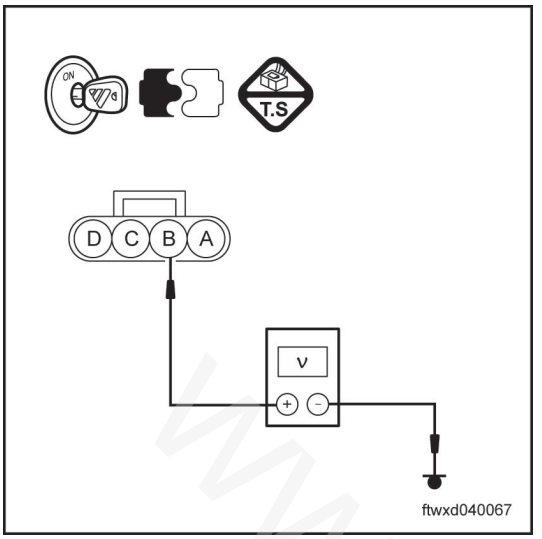
Diagnostic step

1 . Read DTC and data on the diagnostic apparatus

(a) Start the engine until it reaches normal working temperature.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Read the data from intake manifold pressure (MAP) sensor displayed on the diagnostic apparatus.

Displayed DTC and temperature values	Go to	Status
• P0107 • Pressure is lower than or equal to 5 kPa	**The next step**	**Open circuit or to-ground short circuit**
• P0107 • Pressure is higher than 117kPa	**The next step**	**To-circuit short circuit**
• P0107 or P0108 • Pressure is normal	**Diagnosis help**	**Intermittent failure**

2 . Check the reference voltage of MAP sensor



(a) Switch off the ignition.
(b) Disconnect the connector E009 of MAP sensor.
(c) Turn the ignition switch to “ON”.
(d) Measure the voltage between pin B of connector E009 of MAP sensor and ground.

Standard voltage

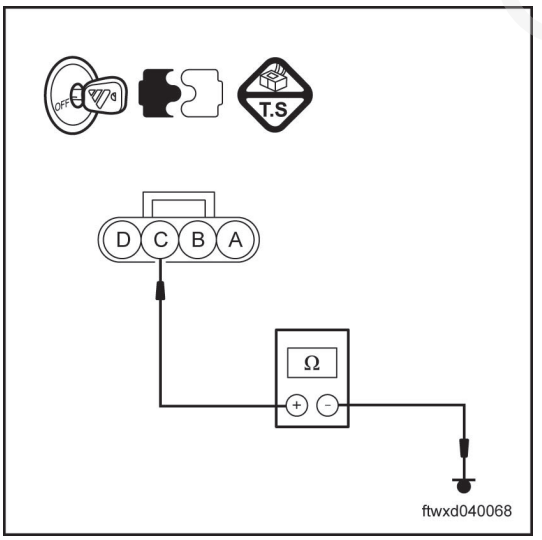
Multimeter Connection	Specified Condition
E009 (B) - ground	5.0 ± 0.25 V

Are the results normal?

Yes > go to next step.

No > Maintain or replace the connector or harness. If the harness is normal, replace the ECM.

3 . Check the sensor ground .



(a) Switch off the ignition.
(b) Disconnect the connector E009 of MAP sensor.
(c) Measure the resistance between pin C of connector E009 of MAP sensor and ground.

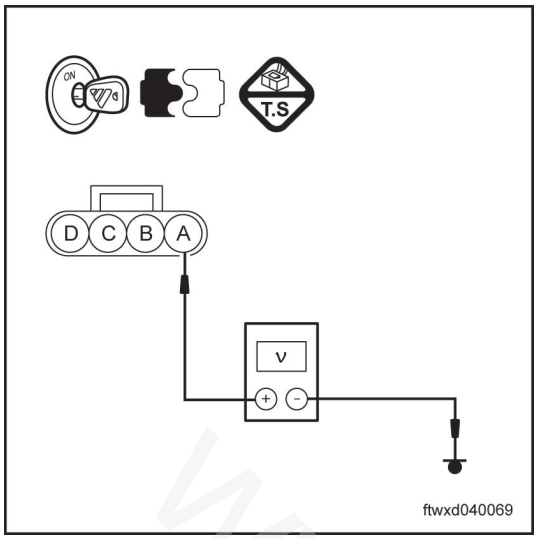
Resistance: < 2 Ω

Are the results normal?

Yes > go to next step.

No > Maintain or replace the connector or harness. If the harness is normal, replace the ECM.

4 . Check the signal wire of MAP



(a) Switch off the ignition.
(b) Disconnect the connector E009 of MAP sensor.
(c) Disconnect the connector E006 of ECM.
(d) Turn the ignition switch to “ON”.
(e) Measure the voltage between pin A of connector E009 of MAP sensor and ground.

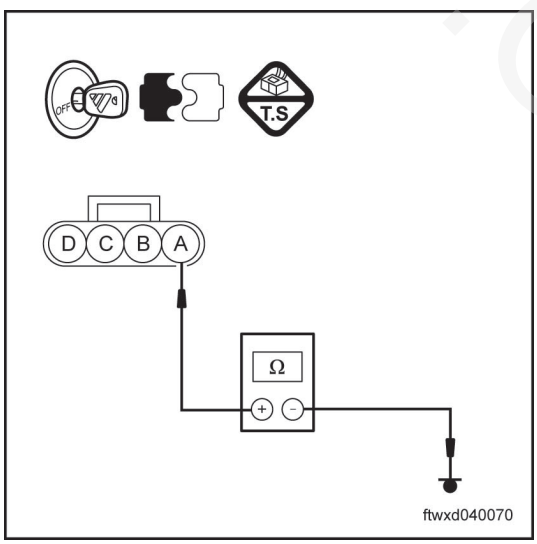
Voltage: 0 V

Are the results normal?

Yes > go to next step.

No > Maintain or replace the connector or harness.

5 . Check the signal wire of MAP



(a) Switch off the ignition.
(b) Disconnect the connector E009 of MAP sensor.
(c) Disconnect the connector E006 of ECM.
(d) Measure the resistance between pin A of connector E009 of MAP sensor and ground.

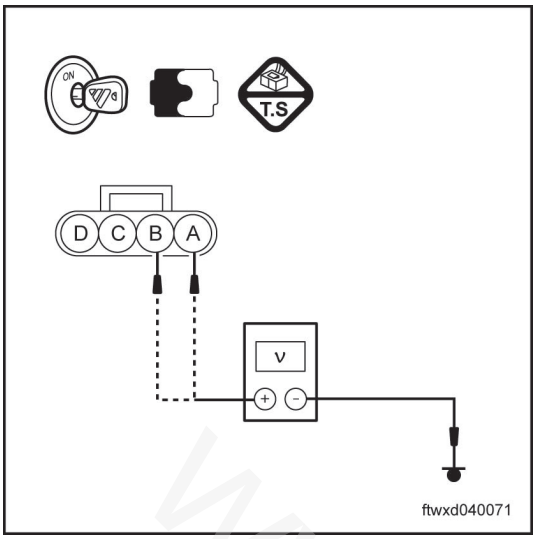
Resistance: $\geqslant$ 1 MΩ

Are the results normal?

Yes > go to next step.

No > Maintain or replace the connector or harness.

6 . Check the MAP signal



(a) Connect the connector E009 of MAP sensor.

(b) Start the engine. Set the digital universal meter to its DC voltage position, connect its black pin to ground, and connect the read pin to pins A or B of MAP sensor connector.

(c) In idling mode, the red pin B shall have a reference voltage of 5V, and pin A shall have a voltage of approximately 1.3V.

(d) In no-load mode, open the throttle gradually, and the voltage of pin A shall be minor. Open the throttle quickly, the voltage of pin A may reach approximately 4V momentarily, and then drop to about 1.5V.

Multimeter Connection	Specified Condition
E009 (B) - ground	• Idle speed: 5.0±0.25V
E009 (A) - ground	• Idle speed: 1.3V • No-load when throttle is opened gradually: 1.3V • Opened quickly: 4V, and then returning to 1.5V

Are the results normal?

Yes > go to next step.

No > Maintain or replace the sensor harness, connector or MAP sensor.

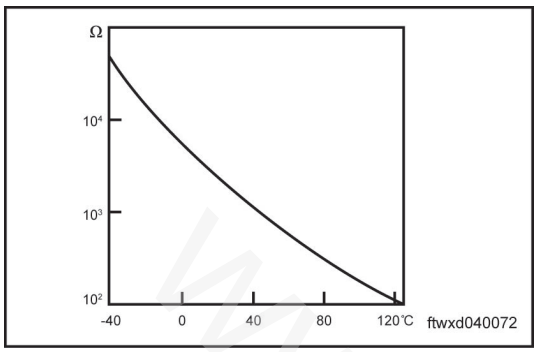
7 . Replace the ECM

(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

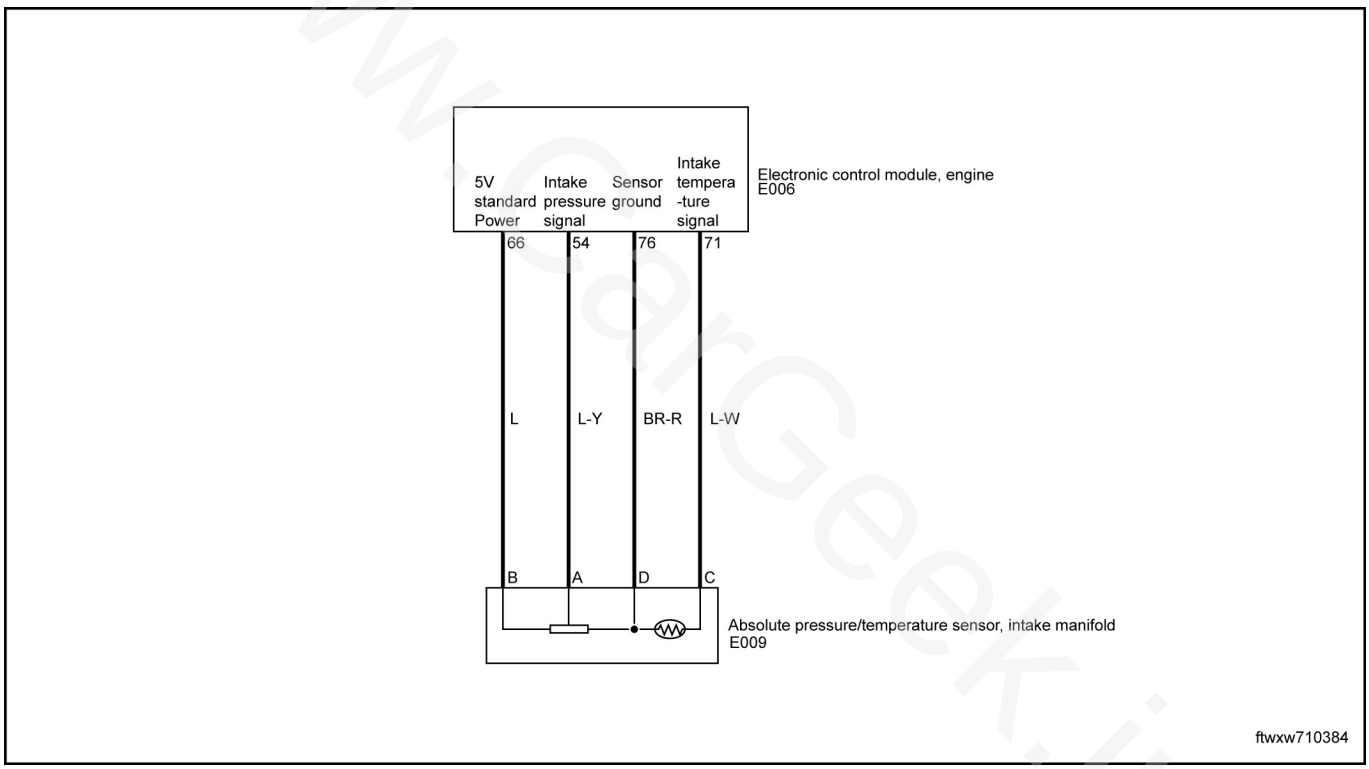
(c) Implement the steps to read sensor data stream. Verify that no DTC exists and the data are normal.

P0112 - LOW VOLTAGE OF INTAKE TEMPERATURE SENSOR CIRCUIT
P0113 - HIGH VOLTAGE OF INTAKE TEMPERATURE SENSOR CIRCUIT



Description Intake temperature sensor is a resister of negative temperature coefficient type. Its resistance is drops when intake temperature rises. When resistance rises, the output voltage of intake temperature sensor rises; when resistance drops, the output voltage of intake temperature sensor drops.

Circuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0112	Low voltage of intake temperature sensor circuit	• Ignition: ON • In 120 seconds after the ignition switch is set to its ON position or after the engine is started up • Sensor output voltage may be lower than 0.2V (equivalent to intake temperature at125℃ or higher) for 4 seconds	• MAT sensor • The 5V reference voltage circuit and ground of MAT sensor are short-circuited • ECM
P0113	High voltage of intake temperature sensor circuit	• Ignition: ON • In 60 seconds after the ignition switch is set to its ON position or after the engine is started up • Sensor output voltage may be lower than 4.6V (equivalent to intake temperature at -45℃ or higher) for 4 seconds	• MAT sensor • Poor contact of the MAT sensor connector • The sensor circuit is subjected to open circuit or high resistance • The 5V reference voltage circuit and 12V power supply are short-circuited • ECM

⚠ **CAUTION**

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**

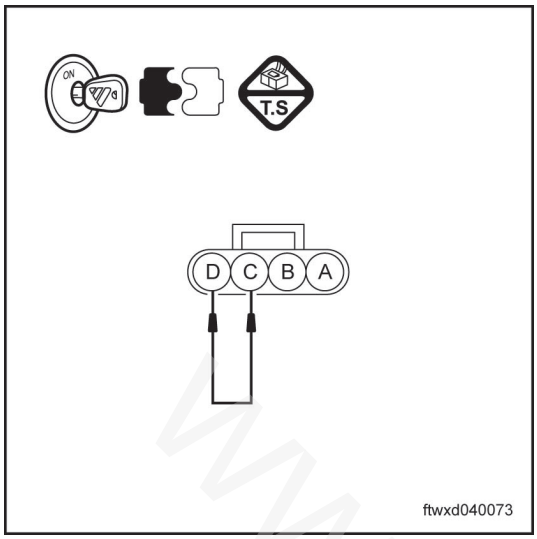
Diagnostic step

1 . Read DTC and data on the diagnostic apparatus

(a) Start the engine until it reaches normal working temperature.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Read the data from intake temperature (MAT) sensor displayed on the diagnostic apparatus

Displayed DTC and temperature values	Go to	Status
• P0113 • Lower than -40℃	The next step	Open circuit or to-voltage short circuit
• P0112 • >140 ℃	Step 5	To-ground short circuit
• P0112 or P0113 • Temperature is normal	Diagnosis help	Intermittent failure

2 . Read the data on the diagnostic apparatus



(a) Switch off the ignition.
(b) Disconnect the connector of MAT sensor.
(c) Connect pins C and D of connector E009 of MAT sensor.
(d) Turn the ignition switch to “ON”.
(e) Read the MAT value displayed on the diagnostic apparatus.

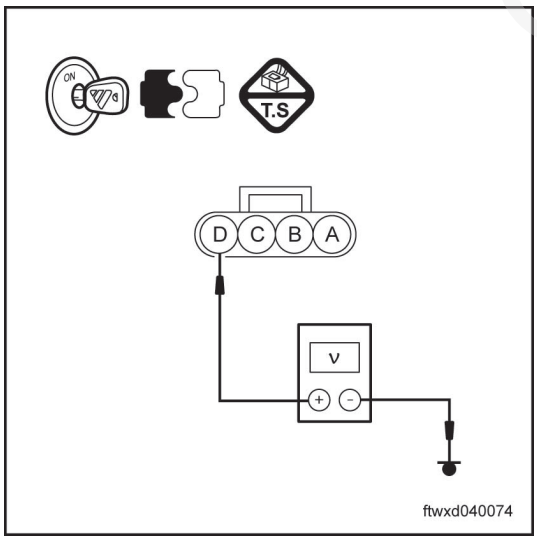
Temperature: about 140 ℃

Check whether the result is normal?

Yes > Verify that the sensor is connected properly. If the connection is normal, replace the MAT sensor.

No > Go to the next step.

3 . Check the reference voltage of MAT sensor



(a) Disconnect the connecting conductor connector E009 of MAT sensor.
(b) Measure the voltage between pin D of connector E009 of MAT sensor and ground

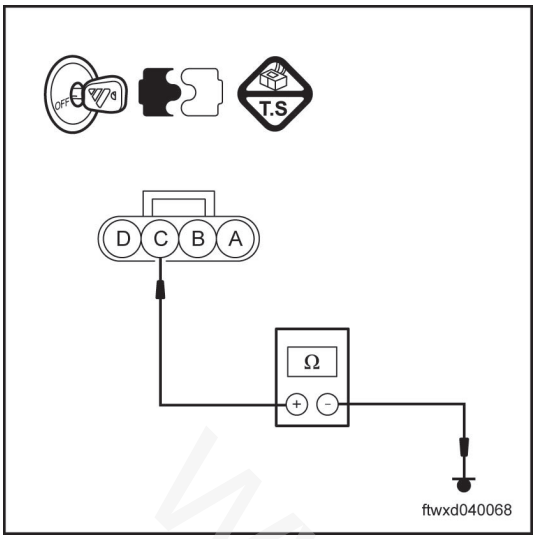
Voltage: 4.5 ~ 5.0V

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the connector or harness. If the harness is normal, replace ECM.

4 . Check the MAT sensor ground.



(a) Disconnect the connecting conductor connector E009 of MAT sensor.

(b) Measure the resistance between pin C of connector E009 of MAT sensor and ground.

Resistance: < 2 Ω

Check whether the result is normal?

Yes > Go to Step 7.

No > Maintain or replace the connector or harness.

5 . Read the data on the diagnostic apparatus

(a) Switch off the ignition.

(b) Disconnect the connector of MAT sensor.

(c) Turn the ignition switch to “ON”.

(d) Read the MAT value displayed on the diagnostic apparatus.

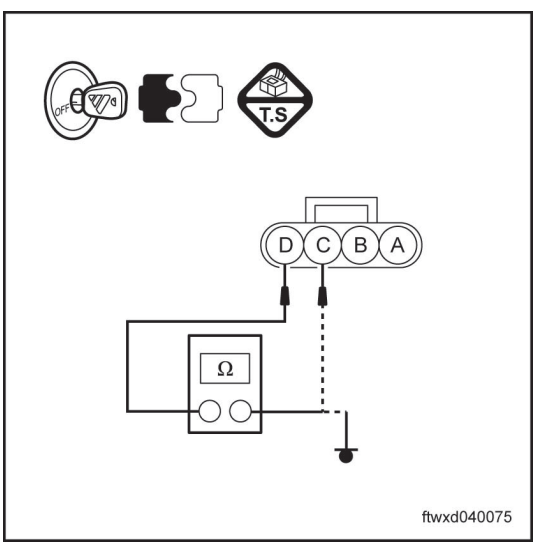
Temperature: about -40 ℃

Check whether the result is normal?

Yes > Verify that the sensor is connected properly. If the connection is normal, replace the MAT sensor.

No > Go to the next step.

6 . Check harness and connector



(a) Switch off the ignition.

(b) Measure the resistance of MAT sensor harness.

Multimeter Connection	Specified Condition
E009(C) – E009(D)	⩾ 1 MΩ
E009 (C) - ground	

Check whether the result is normal?

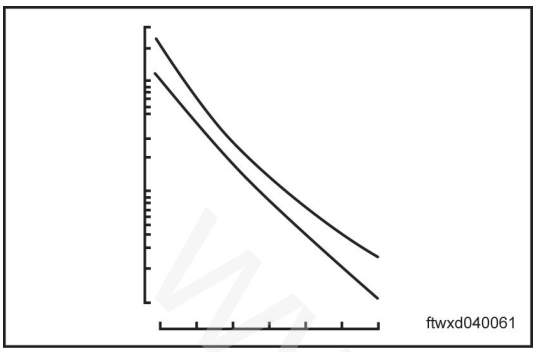
Yes > go to next step.

No > Maintain or replace the connector or harness.

7 . Replace the ECM

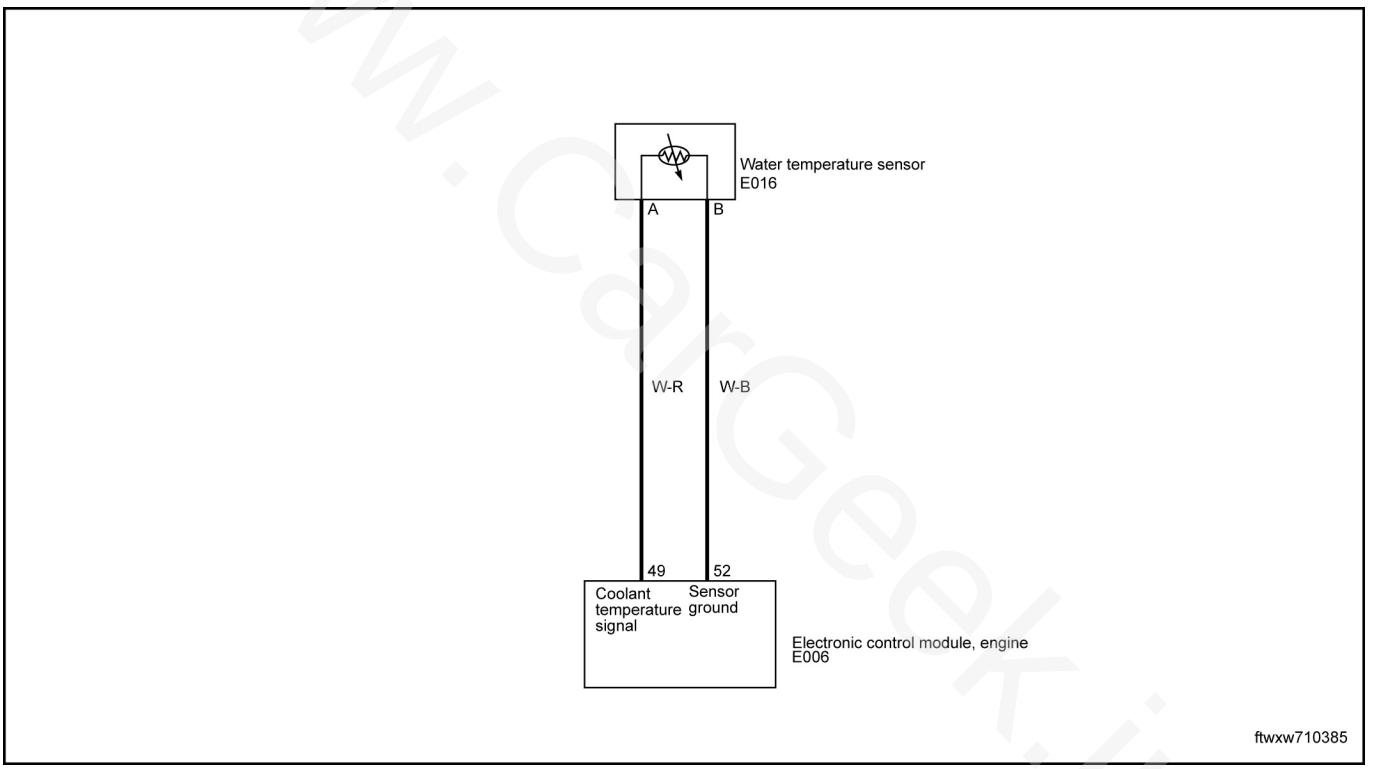
(a) Replace the ECM.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Verify that no DTC exists and the data are normal.

P0117-LOW VOLTAGE OF COOLANT TEMPERATURE SENSOR CIRCUIT
P0118-HIGH VOLTAGE OF COOLANT TEMPERATURE SENSOR CIRCUIT



Description Engine coolant temperature sensor is a resister of negative temperature coefficient type. It is characterized by reduction of resistance when engine coolant temperature rises. When resistance rises, the output voltage of engine coolant temperature sensor rises; when resistance drops, the output voltage of engine coolant temperature sensor drops.

Circuit DiagramCircuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0117	Low voltage of coolant temperature sensor circuit	• Ignition: ON • In 60 seconds after the ignition switch is set to its ON position or after the engine is started up • ECT sensor output voltage may be higher than 0.1V (equivalent to ECT of 145℃ or lower) for 4 seconds	• ECT sensor • The ECT sensor circuit is subjected to to-ground short circuit • ECM
P0118	High voltage of coolant temperature sensor circuit	• Ignition: ON • In 60 seconds after the ignition switch is set to its ON position or after the engine is started up • ECT sensor output voltage may be higher than 4.6V (equivalent to ECT of 145℃ or lower) for 4 seconds	• ECT sensor • Poor contact of the ECT sensor connector • The ECT sensor circuit is subjected to open circuit, or the 12V power supply is short-circuited • ECM

04

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **Once either DTCP0117 or P0118 is detected, ECM enters into its failure protection mode. In the said failure protection mode, ECM tacitly approves the ECT values, and the cooling fan works at high speed when the ignition switch is set to its ON position. The failure protection mode will remain till the ECM detects acceptable conditions.**

Diagnostic step

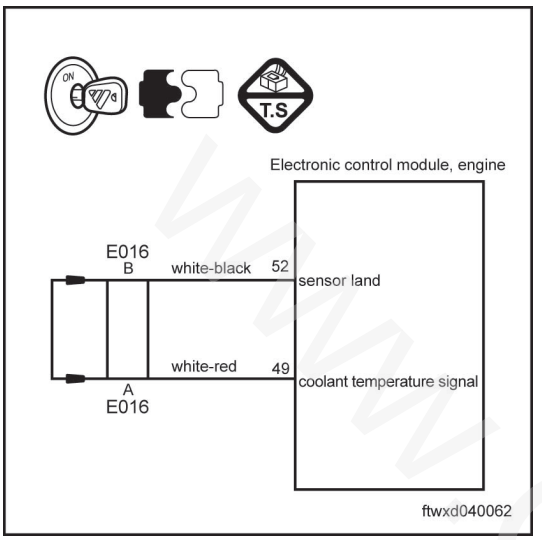
1 . Read DTC and data on the diagnostic apparatus

(a) Start the engine until it reaches normal working temperature.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Read the data from coolant temperature (ECT) sensor displayed on the diagnostic apparatus

Displayed DTC and temperature values	Go to	Status
• P0118 • Approximately - 40°C	The next step	Open circuit or to-power-supply short circuit
• P0117 • Approximately 140°C or higher	Step 5	To-ground short circuit

Displayed DTC and temperature values	Go to	Status
• P0117 or P0118 • Between 80°C and 100°C	Diagnosis help	Intermittent failure

2 . Read the data on the diagnostic apparatus



(a) Switch off the ignition.
(b) Disconnect the ECT sensor connector.
(c) Connect pins A and B of connector E016 of MAT sensor.
(d) Turn the ignition switch to “ON”.
(e) Read the coolant temperature value displayed on the diagnostic apparatus

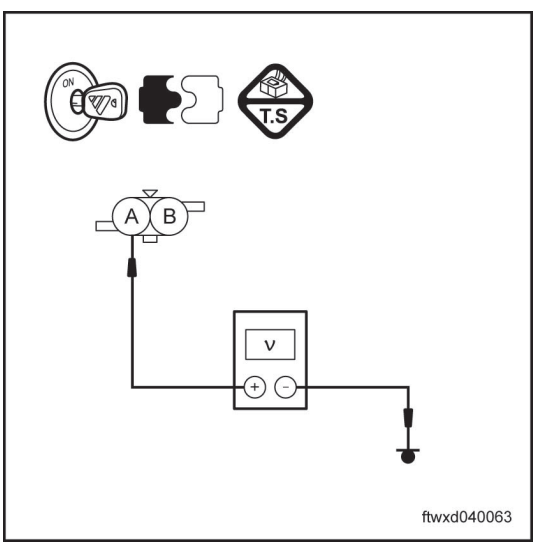
Temperature: about 140 ℃

Check whether the result is normal?

Yes > Verify that the sensor is connected properly. If the connection is normal, replace the ECT sensor.

No > Go to the next step.

3 . Check the reference voltage of ECT sensor



(a) Disconnect the connection wires of pins A and B of connector E016 of ECT sensor.
(b) Measure the voltage between pin A of connector E016 of ECT sensor and ground.

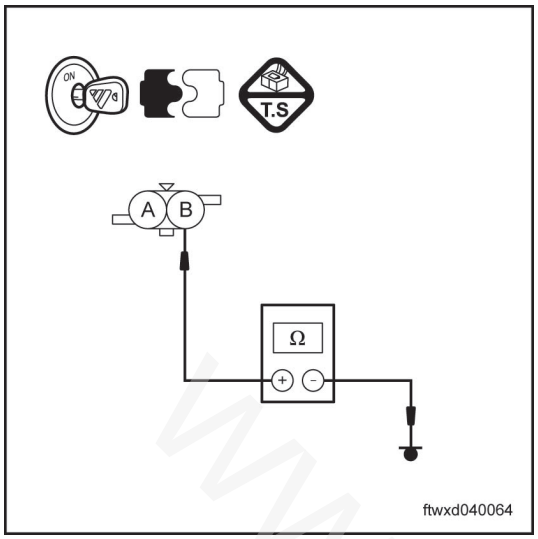
Voltage: 4.5 ~ 5.0V

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of ECT sensor. If the harness is normal, replace ECM.

4 . Check the ECT sensor ground.



(a) Disconnect the connection wires of pins A and B of connector E016 of ECT sensor.

(b) Measure the resistance between pin B of connector E016 of ECT sensor and ground.

Resistance: < 2 Ω

Check whether the result is normal?

Yes > Go to Step 7.

No > Maintain or replace the connector or harness.

5 . Read the data on the diagnostic apparatus

(a) Switch off the ignition.

(b) Disconnect the ECT sensor connector.

(c) Turn the ignition switch to “ON”.

(d) Read the coolant temperature value displayed on the diagnostic apparatus

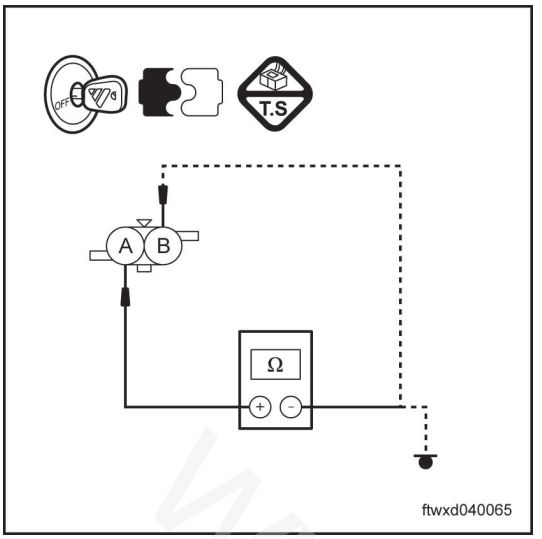
Temperature: approximately - 40°C

Check whether the result is normal?

Yes > Verify that the sensor is connected properly. If the connection is normal, replace the ECT sensor.

No > Go to the next step.

6 . Check harness and connector



(a) Switch off the ignition.
(b) Measure the resistance of ECT sensor harness.

Multimeter Connection	Specified Condition
E016(A)-E016(B)	⩾ 1 MΩ
E016 (A) - Ground	

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the connector or harness.

7 . Replace the ECM

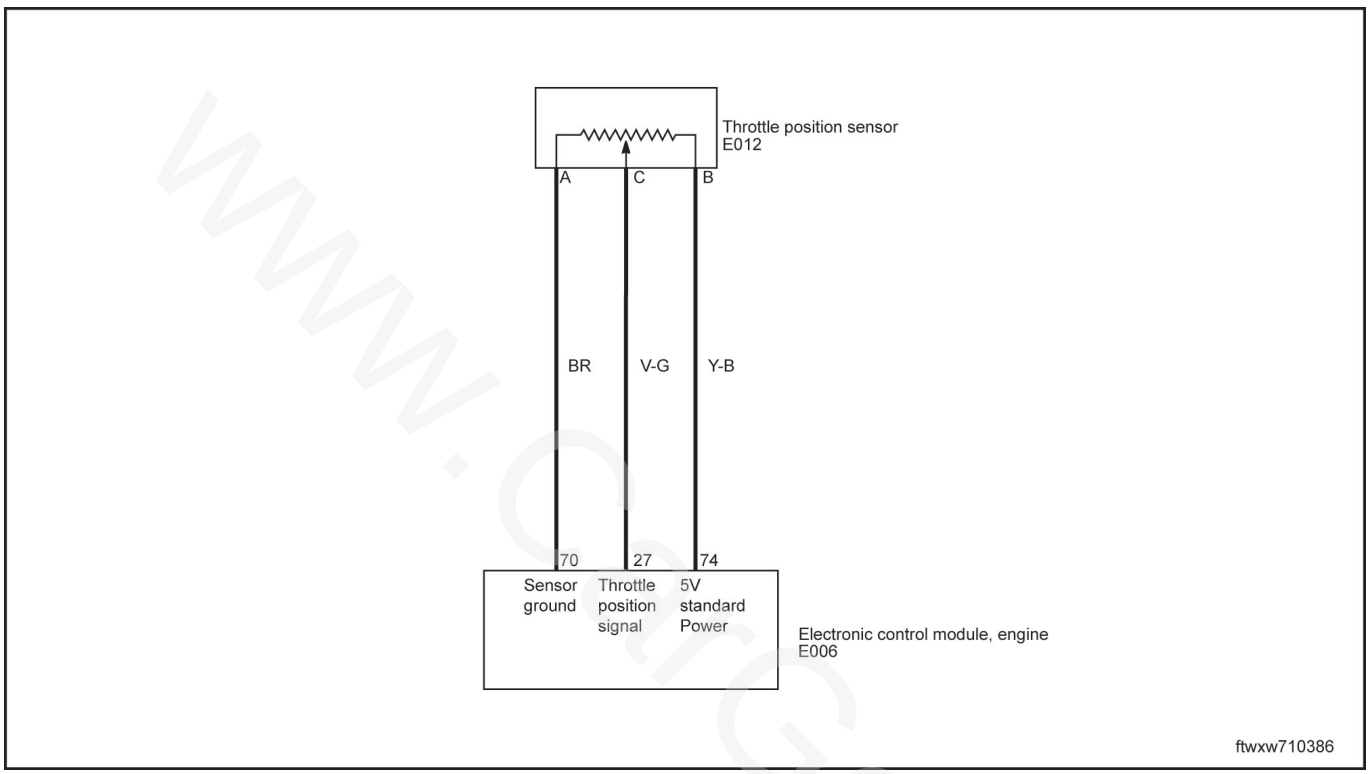
(a) Replace the ECM.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Verify that no DTC exists and the data are normal.

P0122-LOW VOLTAGE OF THROTTLE POSITION SENSOR
P0123-HIGH VOLTAGE OF THROTTLE POSITION SENSOR

Description

ECM provides 5V reference voltage and ground for the throttle position sensor (TPS). TPS sends a feedback voltage signal of throttle opening to the ECM. The voltage signal is changed from signal 0.5V (when closed) to approximately 4.5V (when fully opened).

Circuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0122	Low voltage of throttle position sensor	• Ignition: ON • In 60 seconds after the ignition switch is set to its ON position or after the engine is started up • In the engine idle speed position, the sensor output voltage remains lower than 0.35V for 4 seconds	• TPS or maladjustment • TPS connector is subjected to poor contact, and the sensor harness is open-circuited or to-ground short-circuited • ECM
P0123	High voltage of throttle position sensor	• Ignition: ON • In 60 seconds after the ignition switch is set to its ON position or after the engine is started up • In the engine idle speed position, the sensor output voltage remains higher than 4.8V for 4 seconds	• TPS • TPS connector is subjected to poor contact, and the sensor harness is open-circuited or to-power-supply short-circuited • ECM

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnostic step

1 . Read DTC and data on the diagnostic apparatus

(a) Start the engine until it reaches normal working temperature.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Depress the accelerator pedal gradually till the throttle is fully opened
(e) Read the data of throttle signal displayed on the diagnostic apparatus

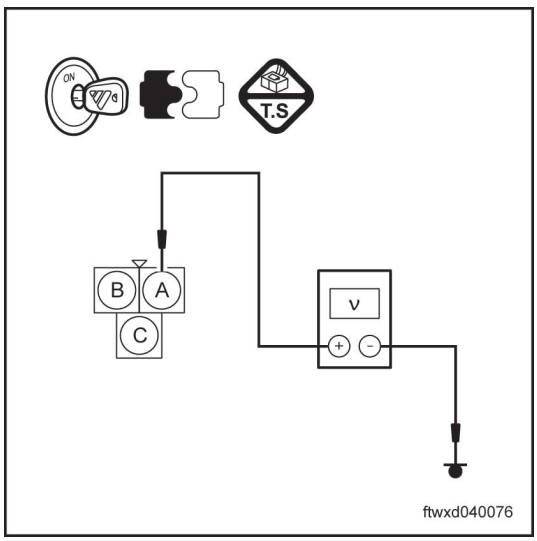
Voltage varies consecutively between 0.35V and 4.8V.

Check whether the result is normal?

Yes > Intermittent trouble exists; refer to the diagnostic help.

No > If change of voltage occurs discontinuously, replace TPS. If the voltage is constant, go to the next step.

2 . Check the reference voltage of throttle position sensor.



(a) Switch off the ignition.
(b) Disconnect the connector E012 of TPS.
(c) Turn the ignition switch to “ON”.
(d) Measure the voltage of pin A of connector E012 of TPS.

Standard voltage

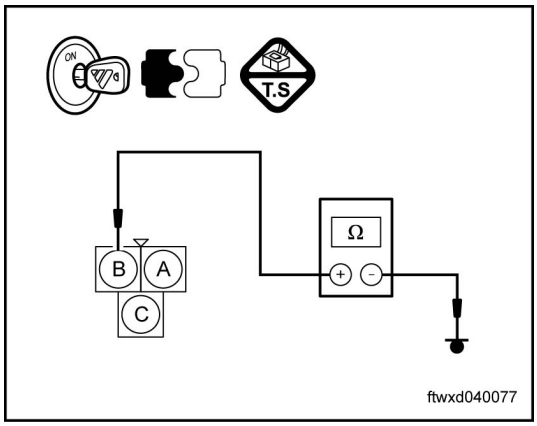
Multimeter Connection	Specified Condition
E012 (A) - ground	4.5～5.0 V

Check whether the result is normal?

Yes > go to next step.

No > Maintenance or replace harness. If the harness is normal, replace the ECM.

3 . Check the earth wire of throttle position sensor



(a) Switch off the ignition.
(b) Disconnect the connector E012 of TPS.
(c) Measure the resistance between pin B of connector E012 of TPS sensor and ground.

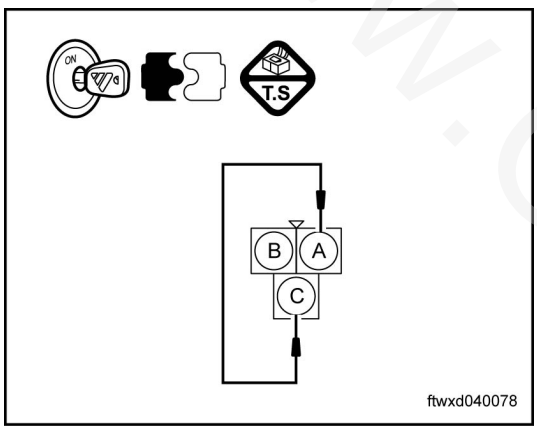
Resistance: < 2 Ω

Check whether the result is normal?

Yes > go to next step.

No > Maintenance or replace harness. If the harness is normal, replace the ECM.

4 . Check the signal wire of throttle position sensor



(a) Connect the pins A and C of connector E012 of TPS.
(b) Use a diagnostic apparatus to perform sensor data stream reading procedures.

Voltage: 4 V

Check whether the result is normal?

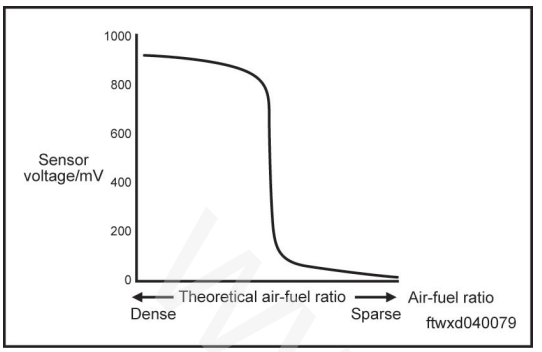
Yes > go to next step.

No > Maintenance or replace harness. If the harness is normal, replace the ECM.

5 . Replace the ECM

(a) Replace the ECM.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Implement the steps to read sensor data stream.
(d) Verify that no DTC exists and the data are normal.

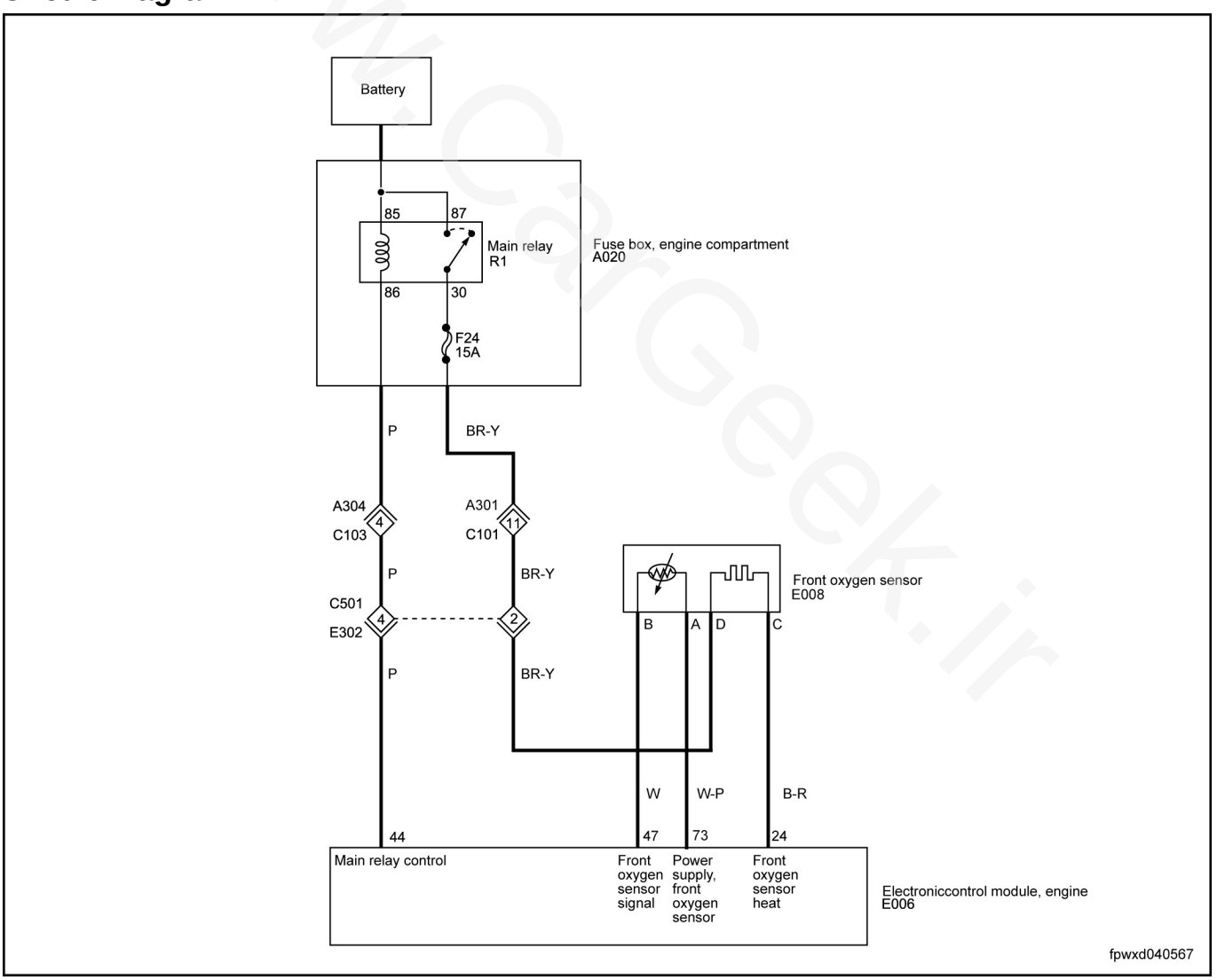
P0131-TO-GROUND SHORT-CIRCUIT OF FRONT OXYGEN SENSOR
P0132-TO-POWER-SUPPLY SHORT-CIRCUIT OF FRONT OXYGEN SENSOR
P0134-OPEN CIRCUIT OF FRONT OXYGEN SENSOR



Description

ECM provides a voltage of approximately 450mV to between pins 47 and 73 of ECM. The voltage of oxygen sensor may vary from approximately 1V to approximately 0.1V as the exhaust changes from thick to thin. When the temperature is below 350℃, the oxygen sensor fails to work normally. An open-circuited oxygen sensor and low-temperature oxygen sensor may make the system to enter into its "open loop" status.

Circuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0131	To-ground short-circuit of front oxygen sensor	• Engine control system at closed ring • Engine speed is lower than 6000RPM • The voltage of front oxygen sensor is lower than 0.03V for at least 25 seconds • DTC P0107, P0108, P0117, P0118, P0122, P0123 and P0335 does not exist	• Front Oxygen Sensor • To-ground short-circuit of front oxygen sensor harness • ECM
P0132	To-power-supply short-circuit of front oxygen sensor	• The voltage of front oxygen sensor is higher than 2.5V for at least 25 seconds • DTC P0107, P0108, P0117, P0118, P0122, P0123 and P0335 does not exist	• Front Oxygen Sensor • To-power-supply short-circuit of front oxygen sensor harness • ECM
P0134	Open circuit of front oxygen sensor	• The feedback voltage of front oxygen sensor ranges from 1.3 to 2.5V • DTC P0107, P0108, P0117, P0118, P0122, P0123 and P0335 does not exist	• Front Oxygen Sensor • The front oxygen sensor connector is subjected to poor contact, and the sensor harness is open-circuited • ECM

04

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnosis help

- **Normal change in closed-loop voltage of oxygen sensor displayed in diagnostic apparatus ranges from 0.1V to 1.0V.**
- **Check the oxygen sensor harness. The oxygen may be mounted incorrectly such that it may touch the exhaust tube.**
- **Check for intermittency ground between ECM and sensor harness.**
- **Conduct a balance test of fuel injector, so as to make certain whether or not the thin gas mixture is caused by fuel injector blocking.**
- **Vacuum leak of crankcase causes the thin status.**
- **Leakage of exhaust manifold gasket causes external air to enter into the exhaust tube through the sensor.**

Diagnostic step

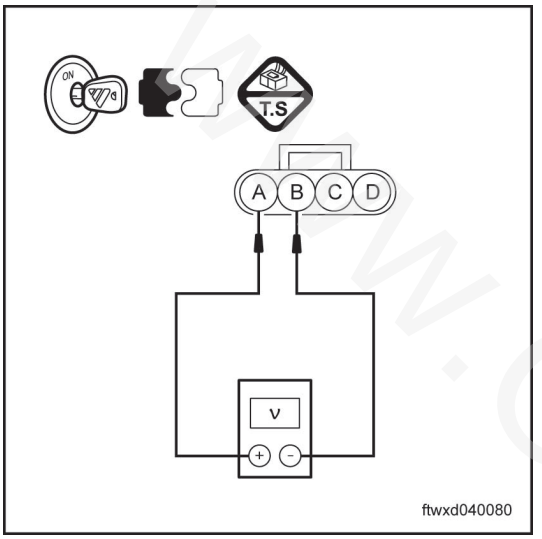
1 . Read the DTC on the diagnostic apparatus

(a) Start the engine until it reaches normal working temperature.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Use a diagnostic apparatus to perform sensor data stream reading procedures.
(d) Engine idling running
(e) Read the data of oxygen sensor signal displayed on the diagnostic apparatus.

Result

Displayed DTC and voltage values	Go to	Status
• P0131 （< 0.03 V）	Go to step 6	To-ground short circuit
• P0132 （> 2.5 V）	Go to step 7	To-power-supply short circuit
• P0134（1.3 V ～ 2.5 V ）	The next step	Open circuit

2 . Check the signal circuit of oxygen sensor (check for open circuit)



(a) Switch off the ignition.
(b) Disconnect the connector E008 of oxygen sensor.
(c) Turn the ignition switch to “ON”.
(d) Measure the voltage between pins A and B of connector E008 of oxygen sensor.

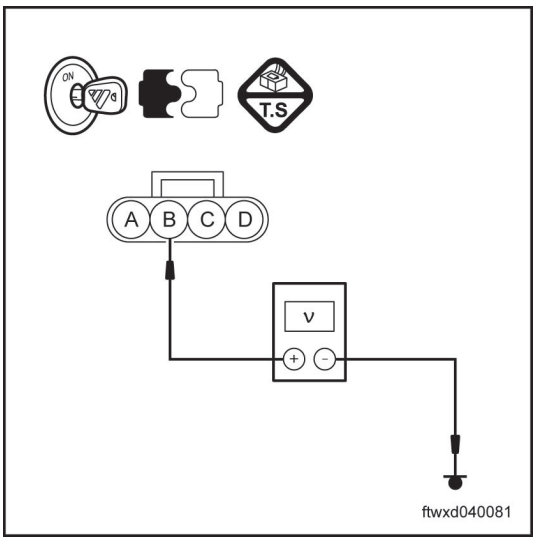
Voltage: 0.45 V

Check whether the result is normal?

Yes > Replace the oxygen sensor.

No > Go to the next step.

3 . Check the signal voltage of oxygen sensor



(a) Switch off the ignition.
(b) Connect the pin A of connector E008 of oxygen sensor to ground.
(c) Turn the ignition switch to “ON”.
(d) Measure the voltage between pin B of connector E008 of oxygen sensor and ground.

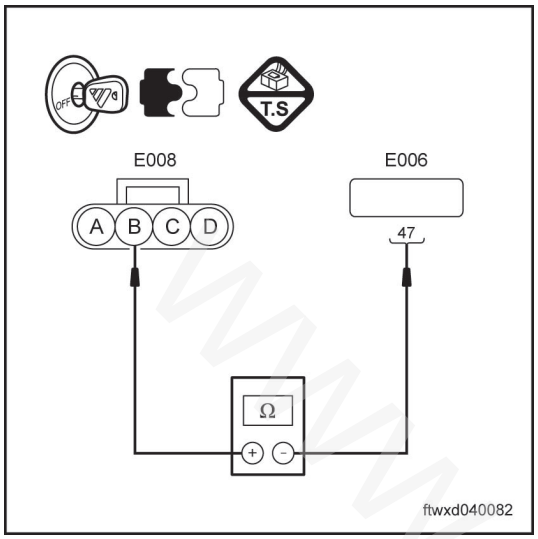
Voltage: 0.45 V

Check whether the result is normal?

Yes > Go to Step 5.

No > Go to the next step.

4 . Check the signal circuit of oxygen sensor (check for open circuit between sensor pin B and ECM pin 47)



(a) Switch off the ignition.
(b) Disconnect the connector E006 of ECM.
(c) Measure the resistance between pin A of connector E008 of oxygen sensor and pin 47 of ECM connector E006.

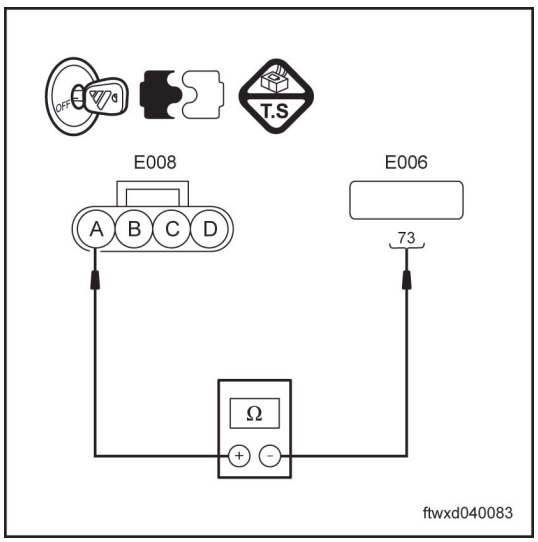
Resistance: < 2 Ω

Check whether the result is normal?

Yes > go to next step.

No > Replace or maintain the signal harness of oxygen sensor.

5 . Check the signal circuit of oxygen sensor (check for open circuit between sensor pin A and ECM pin 73)



(a) Disconnect the E008 pin A from the ground.
(b) Measure the resistance between pin A of connector E008 of oxygen sensor and pin 73 of ECM connector E006.

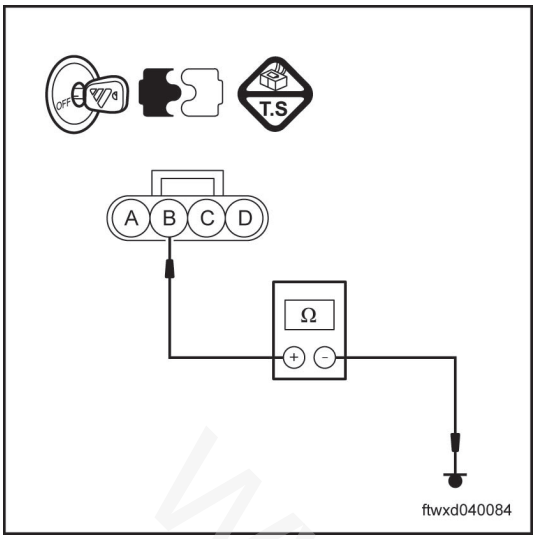
Resistance: < 2 Ω

Check whether the result is normal?

Yes > go to next step.

No > Replace or maintain the signal harness of oxygen sensor.

6 . Check the signal circuit of oxygen sensor (check for to-ground short circuit)



(a) Measure the resistance between pin B of connector E008 of oxygen sensor and ground.

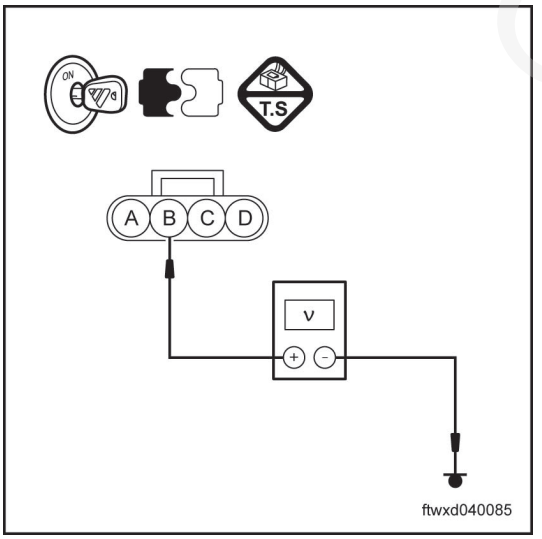
Resistance: ⩾ 1 MΩ

Check whether the result is normal?

Yes > go to next step.

No > Replace or maintain the signal harness of oxygen sensor.

7 . Check the signal circuit of oxygen sensor (check for to-power-supply short circuit between sensor pin B and ECM pin 47)



(a) Turn the ignition switch to “ON”.

(b) Measure the voltage between pin B of connector E008 of oxygen sensor and ground.

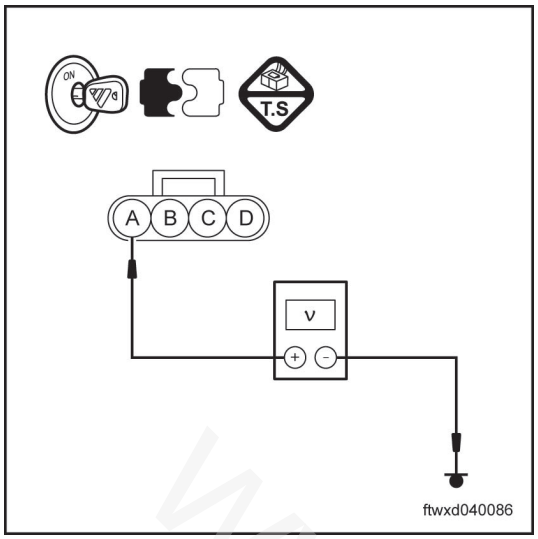
Voltage: 0 V

Check whether the result is normal?

Yes > go to next step.

No > Replace or maintain the signal harness of oxygen sensor.

8 . Check the signal circuit of oxygen sensor (check for to-power-supply short circuit between sensor pin A and ECM pin 73)



(a) Turn the ignition switch to “ON”.

(b) Measure the voltage between pin A of connector E008 of oxygen sensor and ground.

Voltage: 0 V

Check whether the result is normal?

Yes > go to next step.

No > Replace or maintain the signal harness of oxygen sensor.

9 . Replace the ECM

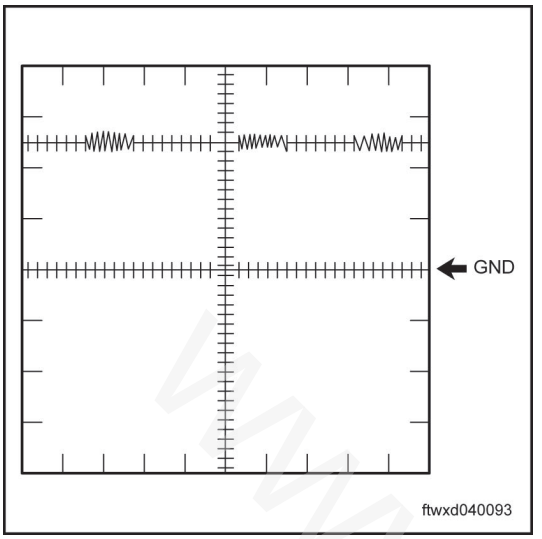
(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

(c) Implement the steps to read sensor data stream.

(d) Verify that no DTC exists and the data are normal.

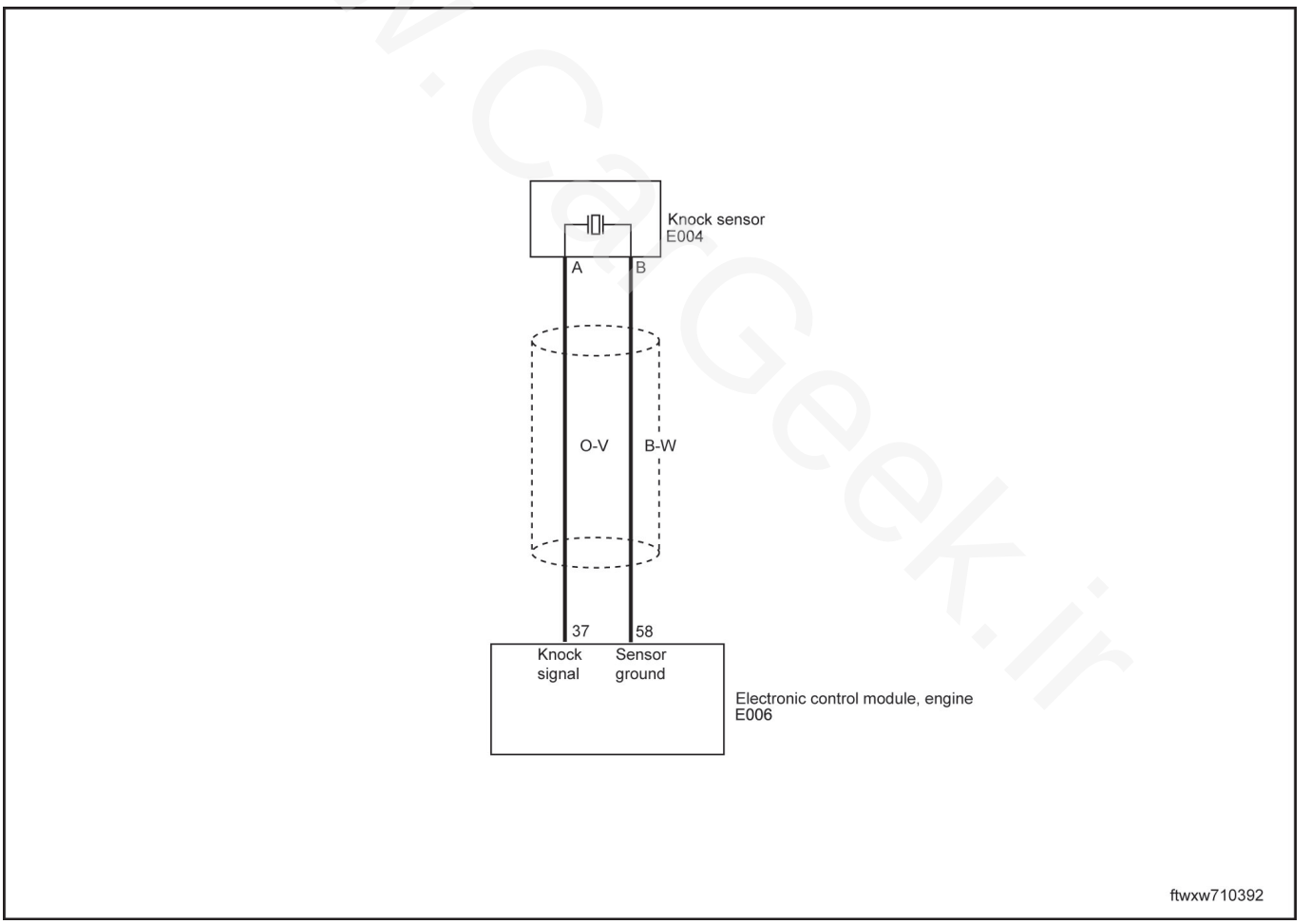
P0325-KNOCKING SYSTEM FAILURE
P0327-KNOCK SENSOR FAILURE



Description

Knocking sensor (KS) is used to detect the engine vibrations. ECM is allowed to postpone the ignition angle based on the received knocking signals. KS generates an alternative current (AC) signal

Circuit Diagram



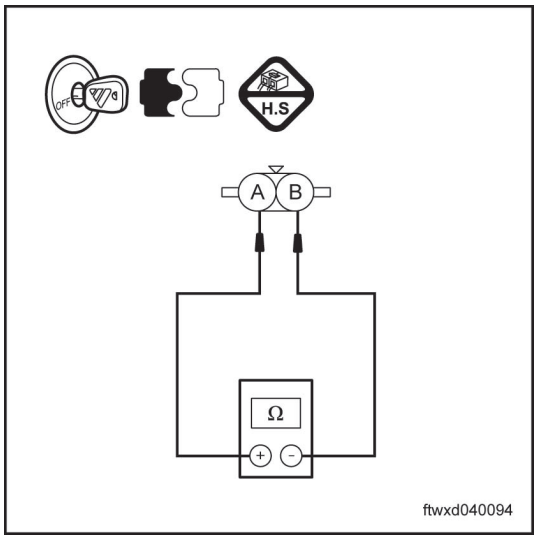
DTC	DTC definition	DTC inspection conditions	Trouble location
P0325	Knocking system failure	• ECT is higher than 80℃ • Engine speed is higher than 2,500RPM • ECM detects that the KS input signal voltage is lower than 0.2V	• KS • Poor contact of the KS connector • KS harness is short-circuited or open-circuited • ECM
P0327	Knock sensor failure	• ECT is higher than 80℃ • Engine speed is higher than 2,500RPM • ECM detects that the KS input signal exceeds the preset range	• KS • Poor contact of the KS connector • KS harness is short-circuited • ECM

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnostic step

1 . Check the resistance of KS knocking sensor



(a) Switch off the ignition.
(b) Disconnect the KS connector E004.
(c) Measure the resistance of KS pins.

Standard voltage

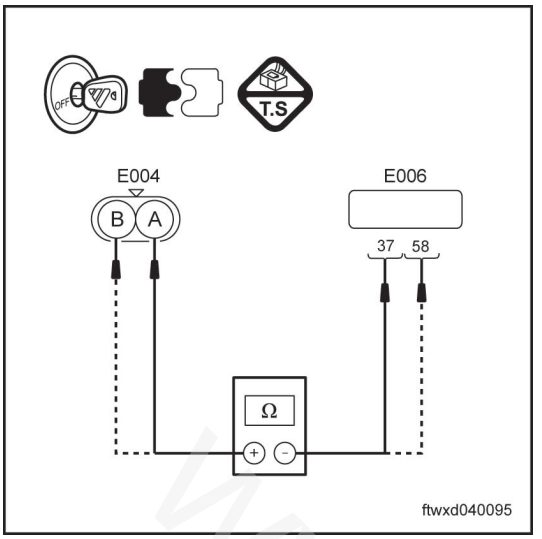
Multimeter Connection	Specified Condition
E004（A）-E004（B）	⩾ 1 MΩ
E004（A）- casing	
E004（B）- casing	

Check whether the result is normal?

Yes > go to next step.

No > Replace KS.

2 . Check the KS harness (check for open circuit between KS and ECM)



(a) Switch off the ignition.
(b) Disconnect the connector E006 of ECM.
(c) Measure the resistance of pins of KS connector E004.

Standard voltage

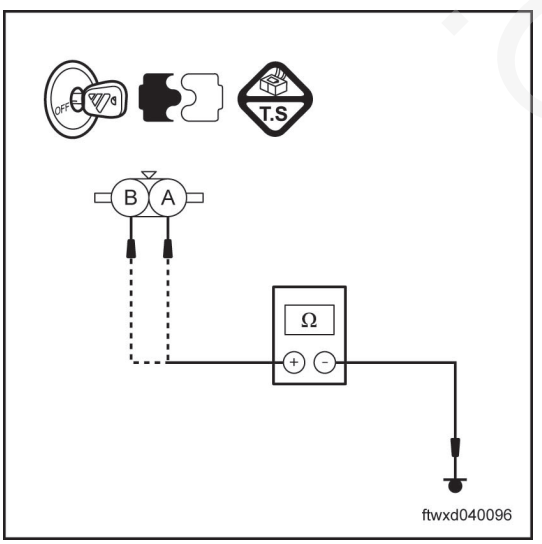
Multimeter Connection	Specified Condition
E004（A）-E006(37)	＜2Ω
E004（B）-E006(58)	

Check whether the result is normal?

Yes > go to next step.

No > Replace KS.

3 . Check the KS harness (check for short circuit between KS and ECM)



(a) Measure the resistance between pins of KS connector E004 and the ground.

Standard voltage

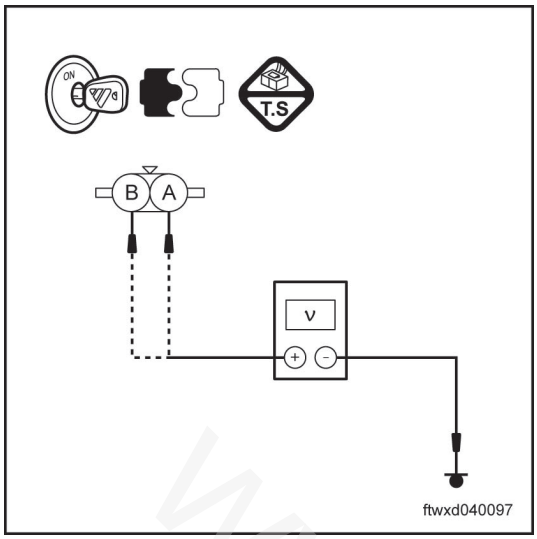
Multimeter Connection	Specified Condition
E004 (A) - ground	⩾ 1 MΩ
E004 (B) - ground	

Check whether the result is normal?

Yes > go to next step.

No > Replace KS.

4 . Check the KS harness (check for to-power-supply short circuit between KS and ECM)



(a) Turn the ignition switch to “ON”.

(b) Measure the voltage between pins of KS connector E004 and the ground.

Standard voltage

Multimeter Connection	Specified Condition
E004 (A) - ground	0V
E004 (B) - ground	

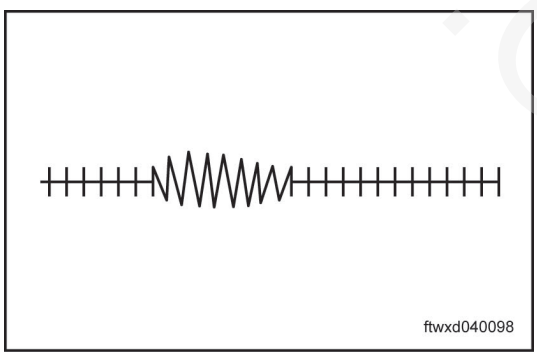
04

Check whether the result is normal?

Yes > go to next step.

No > Replace KS.

5 . Check the signals from KS knocking sensor



(a) Switch off the ignition.

(b) Disconnect the KS connector, and connect it to an oscilloscope.

(c) Turn the ignition switch to its ON position, and allow the engine to idle.

(d) There shall be pulse shape output.

Check whether the result is normal?

Yes > go to next step.

No > Replace KS.

6 . Replace the ECM

(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

(c) Implement the steps to read sensor data stream.

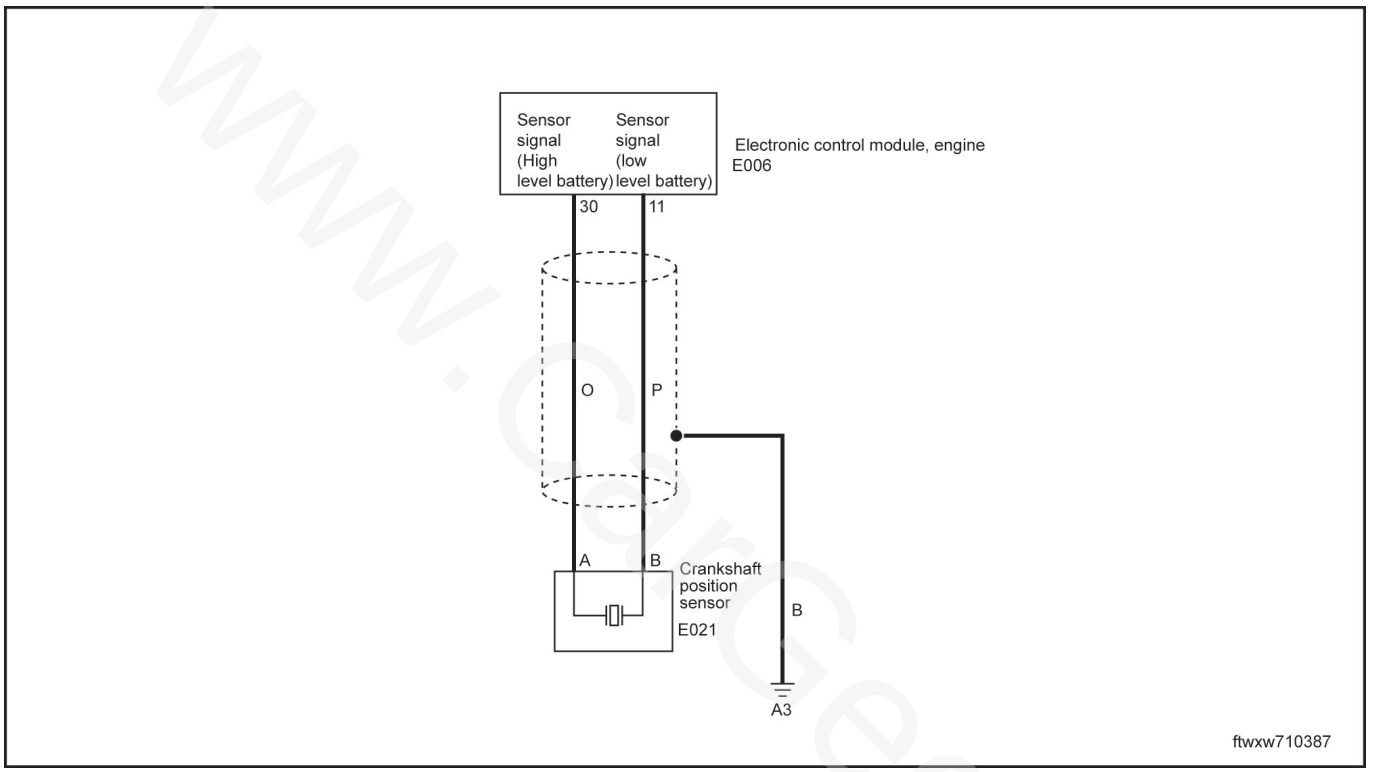
(d) Verify that no DTC exists and the data are normal.

P0336 - CRANKSHAFT POSITION SENSOR CIRCUIT INTERFERING SIGNAL

Description

The crankshaft position (CKP) sensor produces 58 X reference signals. ECM uses 58 X reference signal to calculate engine rotational speed CKP. ECM continuously monitor the number of pulse on the in 58 X reference line bunch and compare it with the signal number of manifold pressure (MAP) it received. If ECM receives incorrect pulse number on the 58 X reference line bunch, it will set up DTCP0336.

Circuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0336	Crankshaft position sensor circuit interfering signal	• Ignition: ON • ECM receives incorrect signal or no signal	• CKP sensor • Poor contact of the connector of CKP sensor • The harness of CKP sensor has short circuit or open circuit • ECM

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnostic step

1 . Read DTC and CKP signal on the diagnostic apparatus

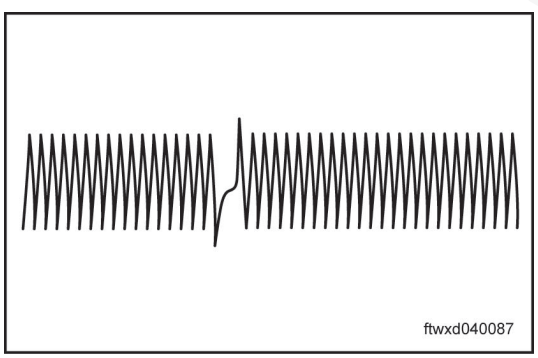
(a) Start the engine until it reaches normal working temperature.
(b) Use a diagnostic apparatus to perform DTC verification procedures.
(c) Use a diagnostic apparatus to perform sensor data stream reading procedures.
(d) Engine idling running
(e) Use a diagnostic apparatus to perform reading the wave form of CKP sensor.

Check whether the result is normal?

Yes > Intermittent trouble exists; refer to the diagnostic help.

No > Go to the next step.

2 . Use a wave meter to check CKP signal



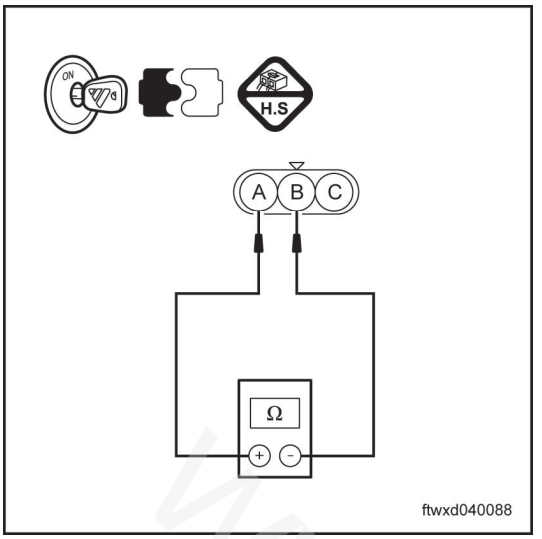
(a) Use a wave meter to check the wave form of CKP sensor signal

Check whether the result is normal?

Yes > Go to Step 5.

No > Go to the next step.

3 . Check the resistance of CKP sensor



(a) Disconnect the connector E021 of CKP sensor.
(b) Switch off the ignition.
(c) Measure the resistance between the pin A and pin B of the CKP sensor E021.

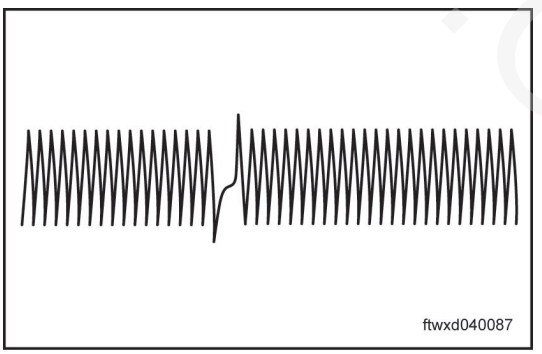
Resistance: 560 ohms ± 10% (25 ± 5 ℃)

Check whether the result is normal?

Yes > go to next step.

No > Replace CK sensor.

4 . Replace and check the CKP sensor



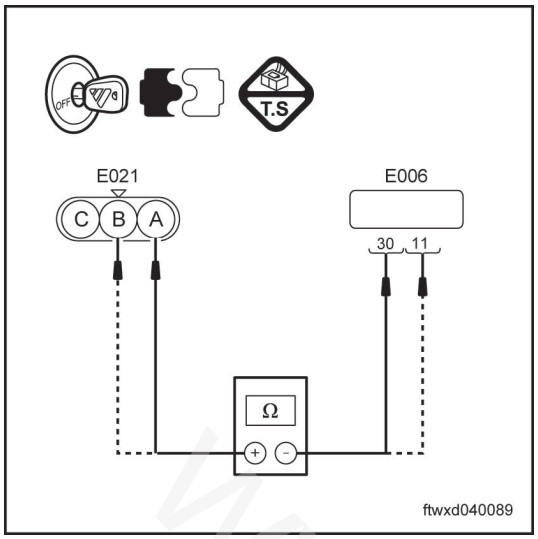
(a) Use a CKP sensor which has been known as normal to replaced onboard CKP sensor.
(b) Use a wave meter to check the wave form of CKP sensor signal

Check whether the result is normal?

Yes > go to next step.

No > Go to Step 7.

5 . Check the harness of CKP sensor (check whether it is of short circuit or open circuit)



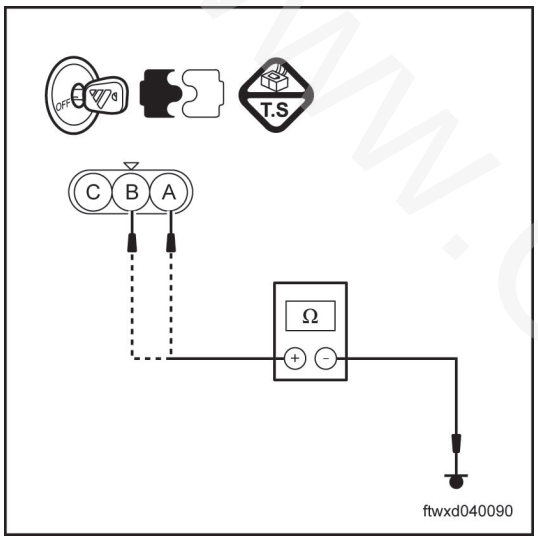
(a) Switch off the ignition.

(b) Disconnect the connector E023 of ECM.

(c) Measure the resistance between the connectors E021 and E006 of the CKP sensor.

Measure the resistance between the connectors E021 and E006 of the CKP sensor.

Multimeter Connection	Specified Condition
E021（A）-E006(30)	＜ 2 Ω
E021（B）-E006(11)	



(d) Measure the resistance between the connector E021 and ground.

Standard resistance (Check whether it is of short circuit to ground)

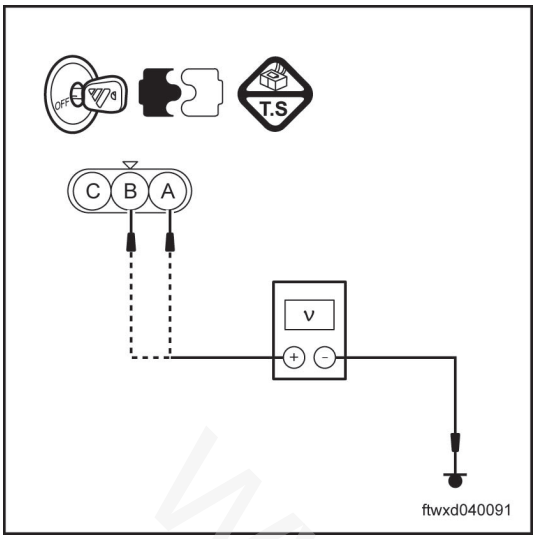
Multimeter Connection	Specified Condition
E021 (A) - ground	⩾ 1 MΩ
E021 (B) - ground	

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the harness between CKP sensor and ECM

6 . Check the harness of CKP sensor (check whether it is of short circuit)



(a) Turn the ignition switch to “ON”.

(b) Measure the voltage between the connector E021 and ground.

Standard resistance (Check whether it is of short circuit to power supply)

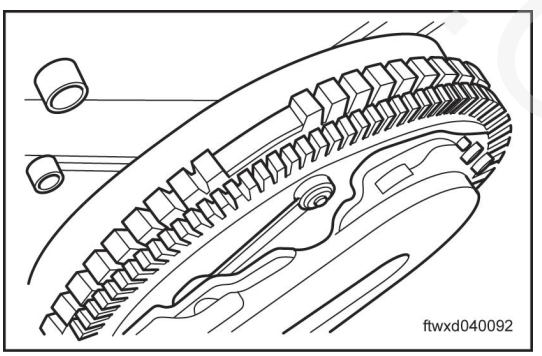
Multimeter Connection	Specified Condition
E021 (A) - ground	0V
E021 (B) - ground	

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the harness between CKP sensor and ECM

7 . Check the signal panel of CKP sensor



(a) Switch off the ignition.

(b) Check whether there are scraps, greasy dirt, foreign objects on the 58X sensor signal tooth, whether the signal panel becomes loose.

(c) Check the clearance for installing CKP sensor

Clearance: 0.3 ～ 1.5 mm

Check whether the result is normal?

Yes > go to next step.

No > Remove any foreign object, wash the 58X sensor signal tooth, if damaged, replace the 58X sensor signal panel.

8 . Replace the ECM

(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

(c) Implement the steps to read sensor data stream.

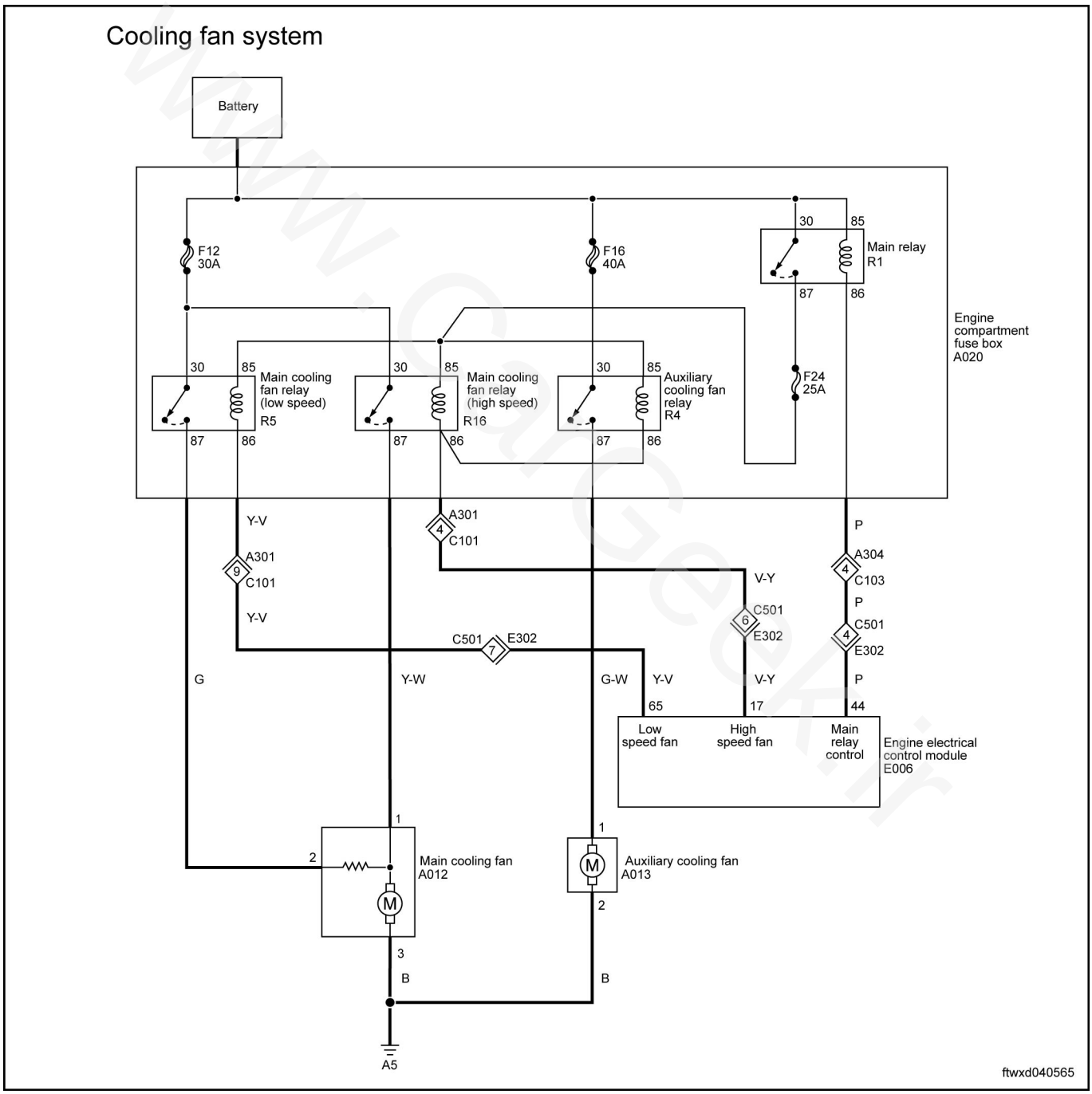
(d) Verify that no DTC exists and the data are normal.

P0480-FAN 1 FAILURE
P0481-FAN 2 FAILURE

Description

Cooling fan is used for cooling the engine system and dispelling heat of condenser after air conditioner is turned on. The fan control is under the effect of signal which is sent to ECM by ECT sensor. If coolant is of high temperature (exceed ECM preset value), the fan operates at a high speed. If coolant is of high temperature (exceed ECM preset value), the fan operates at a high speed. The fan is started at a low speed when turning on the air conditioner.

Circuit Diagram



DTC	DTC definition	DTC inspection conditions	Trouble location
P0480	Fan 1 failure	• Main fan A012 is operating • ECM detects that the trouble in the driving harness of relay R5 lasts for more than 3 seconds	• Main fan relay R5 • Poor contact in the connectors of control harness of main fan A012 • The driving harness R5 is of short circuit or open circuit • ECM
P0481	Fan 2 failure	• Auxiliary fan A013 is operating • ECM detects that the trouble in the driving harness of relay R4 lasts for more than 3 seconds	• Auxiliary fan relay R4 • Poor contact in the connectors of control harness of auxiliary fan A013 • The driving harness R4 is of short circuit or open circuit • ECM

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnostic step

1 . Use a diagnostic apparatus to test action (operate the fan)

(a) Connect the diagnostic apparatus to DLC.

(b) Start the engine until it reaches normal working temperature.

(c) Use a diagnostic apparatus to perform procedure for reading fan dataflow.

Standard: value change

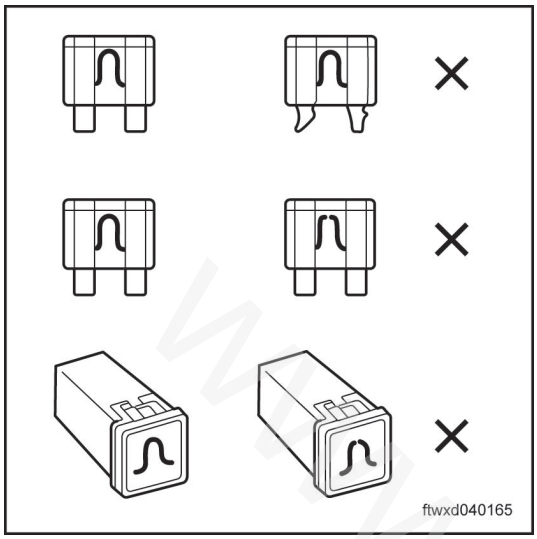
Diagnostic apparatus operation	Specified Condition
Low-speed fan: ON	• Main fan A012 is operating • Auxiliary fan A013 is not operating
Low-speed fan: OFF	• Main fan A012 is not operating • Auxiliary fan A013 is not operating
High-speed fan: ON	• Main fan A012 is operating • Auxiliary fan A013 is operating
High-speed fan: OFF	• Main fan A012 is not operating • Auxiliary fan A013 is not operating

Check whether the result is normal?

Yes > Intermittent trouble exists; refer to the diagnostic help.

No > If the low-speed fan is abnormal, go to next step. No > If the high-speed fan is abnormal, go to step 7.

2 . Check fuse



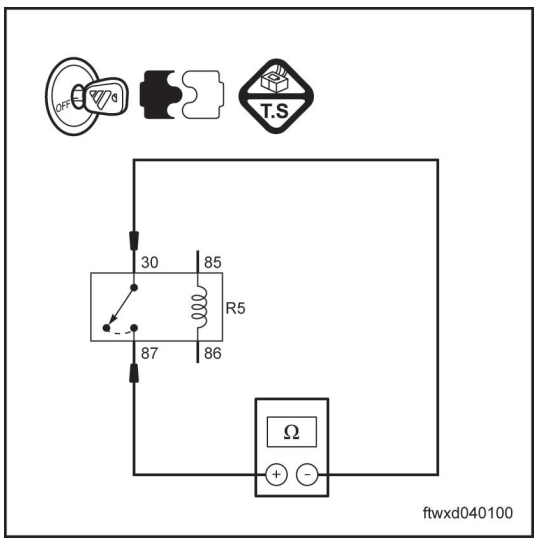
(a) Switch off the ignition.
(b) Disconnect fuse F12 (30A).
(c) Check fuse

Check whether the result is normal?

Yes > go to next step.

No > Replace fuse F12 （30A）. Go to step 5, check whether the harness is short circuit to ground.

3 . Check relay R5



(a) Pull out low-speed main fan relay R5 from the fan slow-blow fuse box in the engine compartment.
(b) Measure the resistance between the pins.

Standard voltage

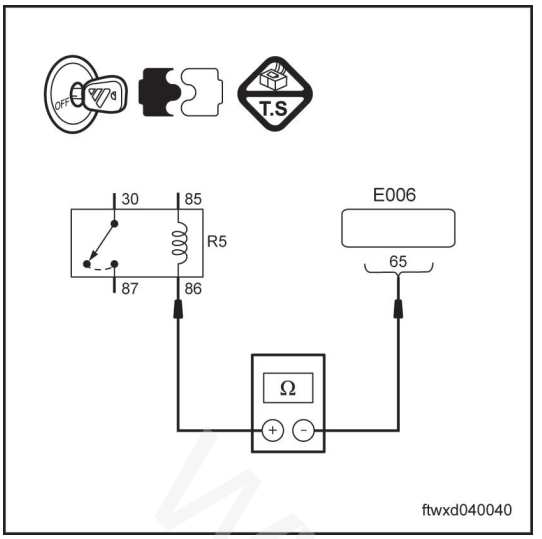
Multimeter Connection	Specified Condition
R5(30) - R5(87)	⩾1MΩ or ＜2Ω

Check whether the result is normal?

Yes > go to next step.

No > Replace the relay R5.

4 . Check the harness (between R5 and E006)



(a) Dismantle the connector E006 of ECM.

(b) Measure the resistance between the pins as per the table below

Standard voltage

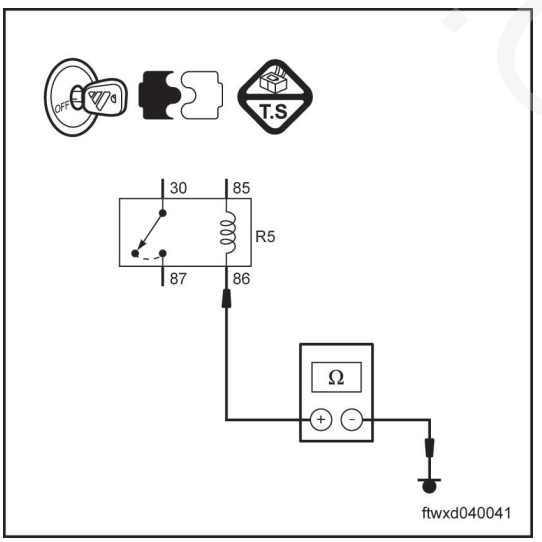
Multimeter Connection	Specified Condition
R5（86）-E006（65）	＜2 Ω

Check whether the result is normal?

Yes > go to next step.

No > Maintenance or replace harness.

5 . Check the harness (between R5 and ground)



(a) Measure the resistance between the pins as per the table below

Standard voltage

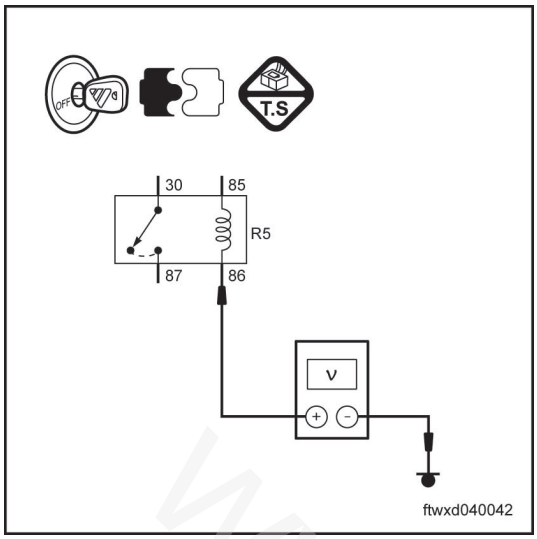
Multimeter Connection	Specified Condition
R5 (86) - Ground	≥ 1 MΩ

Check whether the result is normal?

Yes > go to next step.

No > Maintenance or replace harness.

6 . Check the harness (between R5 and ground)



(a) Turn the ignition switch to “ON”.
(b) Measure the voltage between the pins as per the table below.

Standard voltage

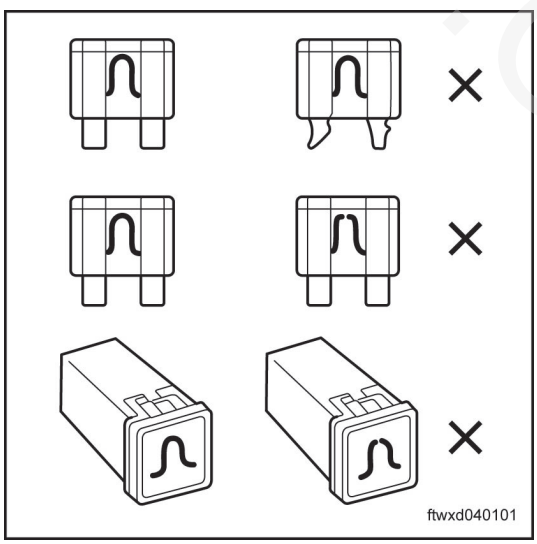
Multimeter Connection	Specified Condition
R5 (86) - Ground	0V

Check whether the result is normal?

Yes > Go to Step 10.

No > Maintenance or replace harness.

7 . Check fuse



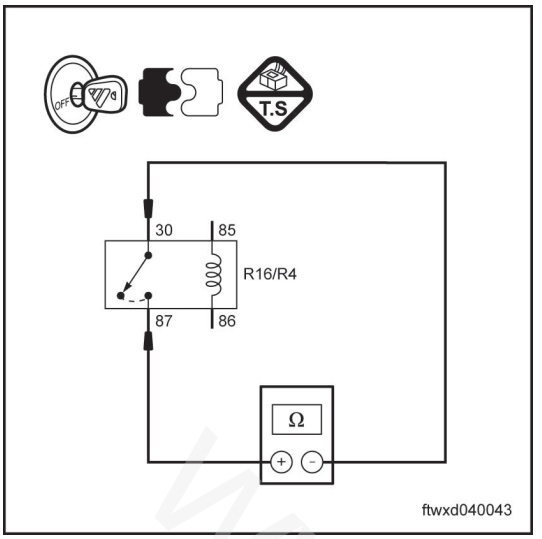
(a) Switch off the ignition.
(b) Disconnect fuse F16 (40A).
(c) Check fuse

Check whether the result is normal?

Yes > go to next step.

No > Replace fuse F16 （30A）. Go to step 9.

8 . Check relays R16 and R4



(a) Pull out fan relay R16 and R4 from the fan slow-blow fuse box in the engine compartment.

(b) Measure the resistance between the pins.

Standard voltage

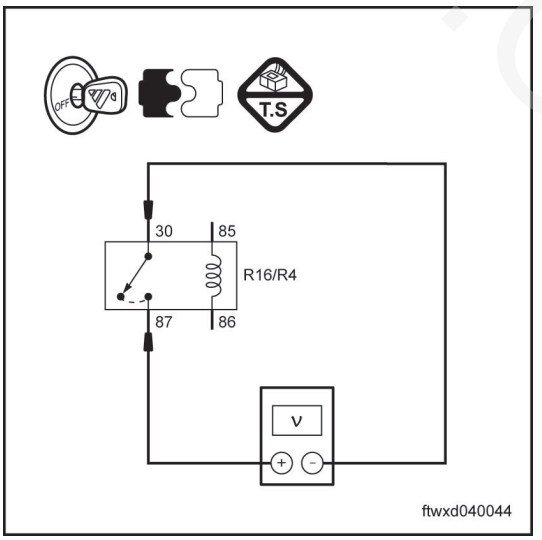
Multimeter Connection	Specified Condition
R16(30) – R16(87)	⩾1M or ＜2
R4(30) – R4(87)	⩾1M or ＜2

Check whether the result is normal?

Yes > go to next step.

No > Replace the relays R16 and R4.

9 . Use a diagnostic apparatus to test action



(a) Use a diagnostic apparatus to perform procedure for reading fan dataflow.

(b) Measure the voltage between the pins.

Standard: value change

Diagnostic apparatus operation	Specified Condition
High-speed fan: ON	Battery voltage
High-speed fan: OFF	0V

Check whether the result is normal?

Yes > go to next step.

No > Maintenance or replace harness.

10 . Replace the ECM

(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

(c) Implement the steps to read sensor data stream.

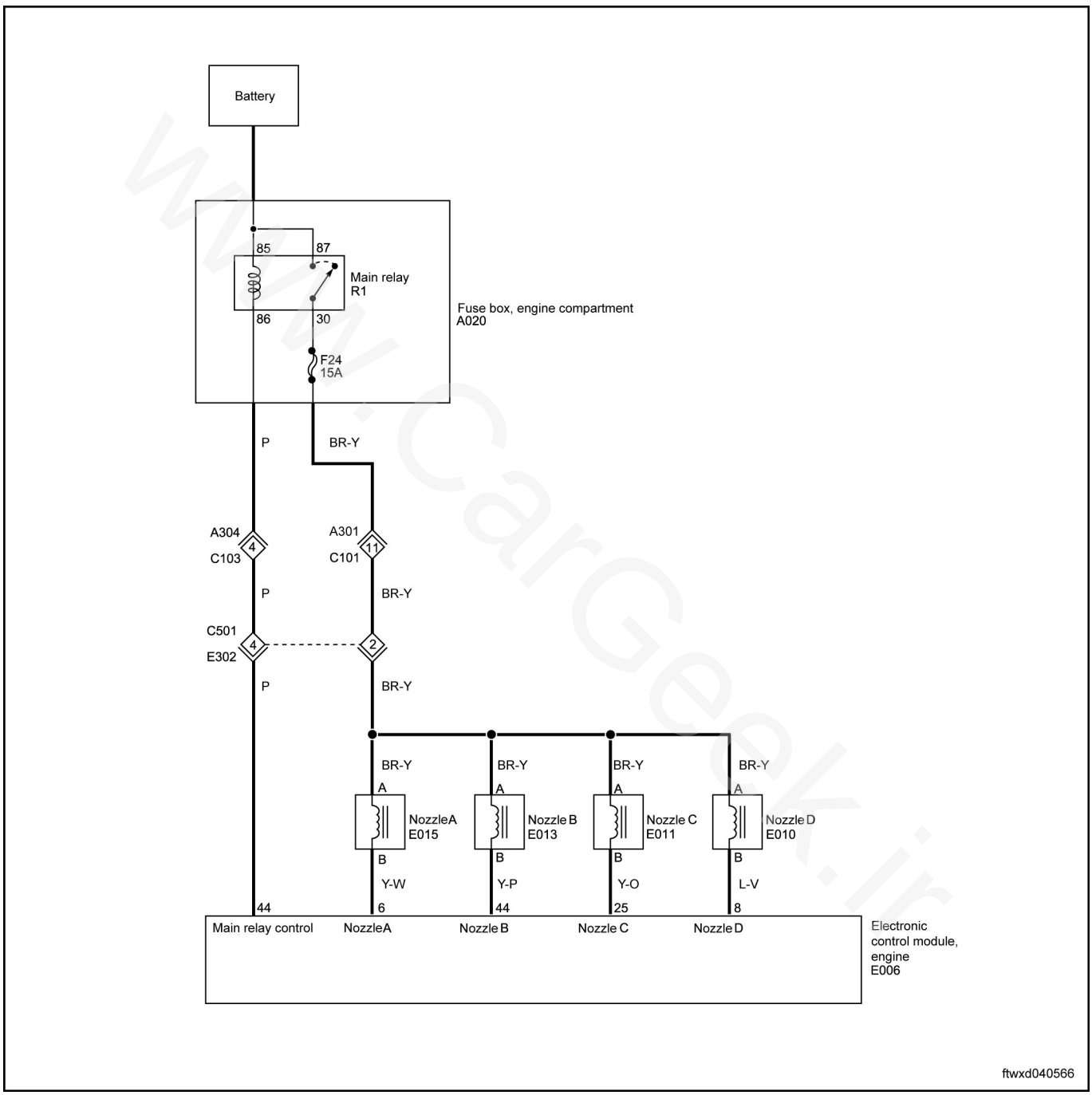
(d) Verify that no DTC exists and the data are normal.

P0201-NOZZLE A CIRCUIT FAILURE

Description

Injector itself is an electromagnetic valve; when it is energized, suction force is produced, the needle valve is sucked up, injecting hole is opened, and the fuel passes the needle valve head and spray out at a high speed.

Circuit Diagram



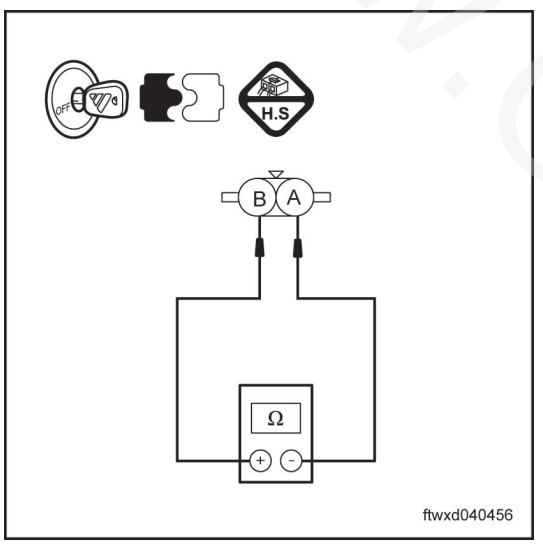
DTC	DTC definition	DTC inspection conditions	Trouble location
P0201	Injector A circuit failure	• Time of engine operation > 0.5 seconds • Oil pump works normally • Duration >5 seconds	• Injector A • Injector harness • ECM

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnostic step

1 . Check the resistance of injector A



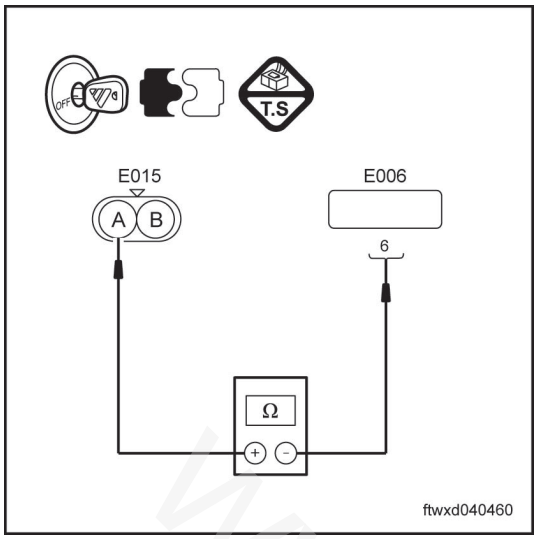
(a) Switch off the ignition.
(b) Disconnect the connector E015 of the injector A.
(c) Measure the resistance between the pin A and pin B of injector A.

Check whether the result is normal?

Yes > go to next step.

No > Replace the injector A.

2 . Check the resistance of harness between injector A and ECM



(a) Switch off the ignition.
(b) Disconnect the connector E006 of ECM.
(c) Measure the resistance of the pins of connector E015 of injector A.

Standard voltage

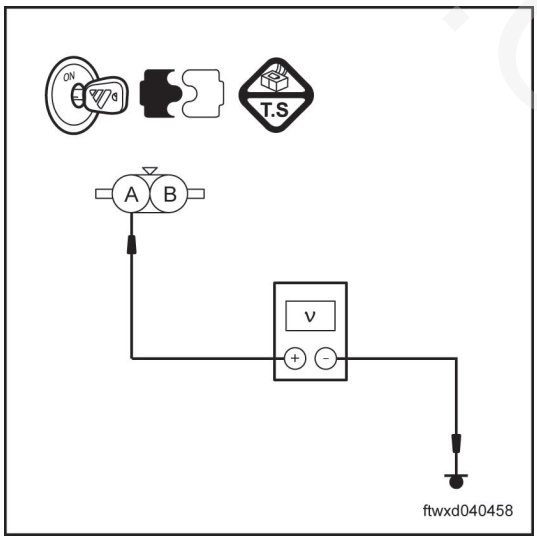
Multimeter Connection	Specified Condition
E015（A）-E006(6)	＜2 Ω

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of injector A.

3 . Check whether the harness of injector A is of short circuit to power supply



(a) Turn the ignition switch to “ON”.
(b) Measure the voltage between of the pin A of connector E015 of injector A to ground.

Standard voltage

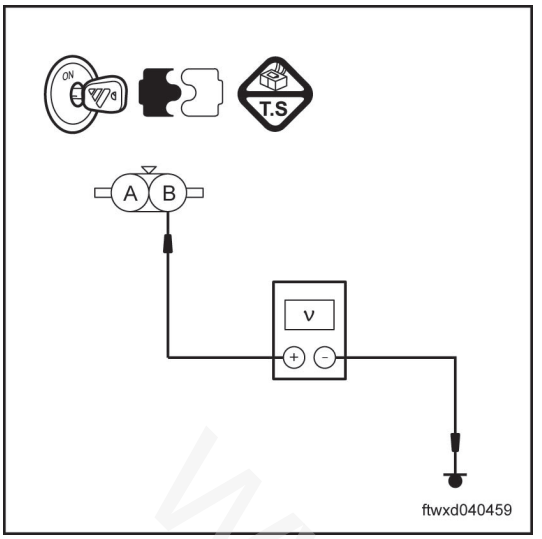
Multimeter Connection	Specified Condition
E015（A) - ground	0V

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of injector A.

4 . Check the power supply cable voltage of injector A



(a) Turn the ignition switch to “ON”.

(b) Measure the voltage between of the pin B of connector E015 of injector A to ground.

Standard voltage

Multimeter Connection	Specified Condition
E015（B) - ground	Battery voltage

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of injector A.

5 . Replace the ECM

(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

(c) Implement the steps to read sensor data stream.

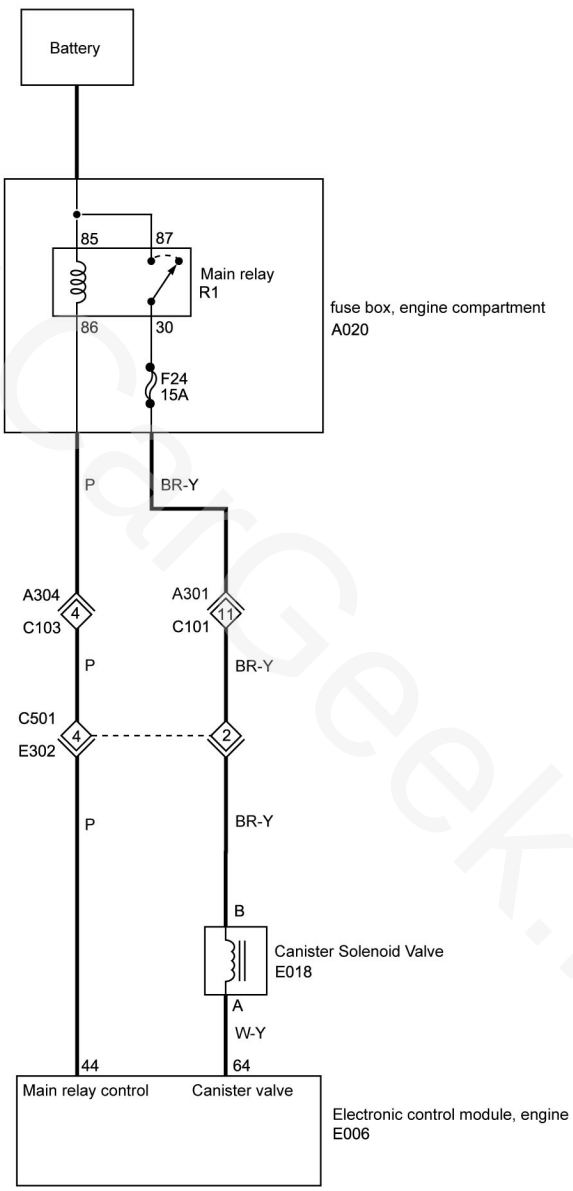
(d) Verify that no DTC exists and the data are normal.

P0443-CARBON POT CONTROL VALVE FAILURE

Description

The carbon pot electromagnetic valve is opened after receiving ECM signal, which de-absorb the carbon pot through absorbing air from the air inlet of the carbon pot under the effect of the manifold vacuum degree.

Circuit Diagram



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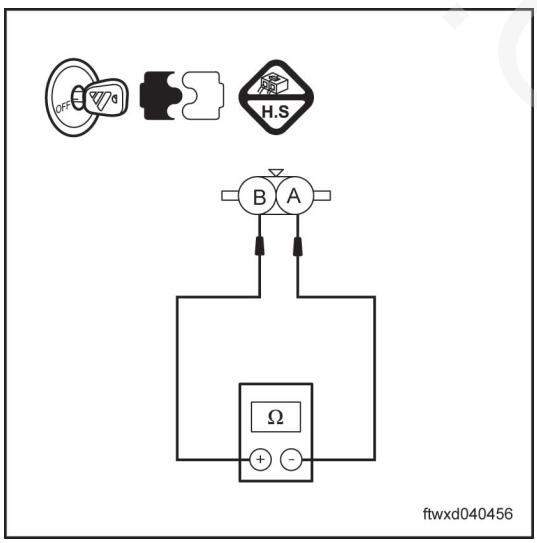
DTC	DTC definition	DTC inspection conditions	Trouble location
P0443	Carbon canister control valve failure	• Time of engine operation > 0.5 seconds • 11V < system voltage > 16V • Duration >5 seconds	• The carbon canister control valve harness is subjected to open circuit or short circuit • Carbon canister control valve • ECM

⚠ CAUTION

- **To implement the following steps, ensure that ECM is grounded properly.**
- **Before conducting electric diagnosis, do refer to the reference circuit diagram and the element information.**
- **Before conducting measurement, check the pins of connectors for rupture, looseness and rust, and ensure that the pins are contacted properly.**
- **If the connection is good, check the sensor signal voltage when moving the connector and harness, and the voltage displayed on the diagnostic apparatus may vary if any trouble occurs.**

Diagnostic step

1 . Check the resistance of carbon pot control valve



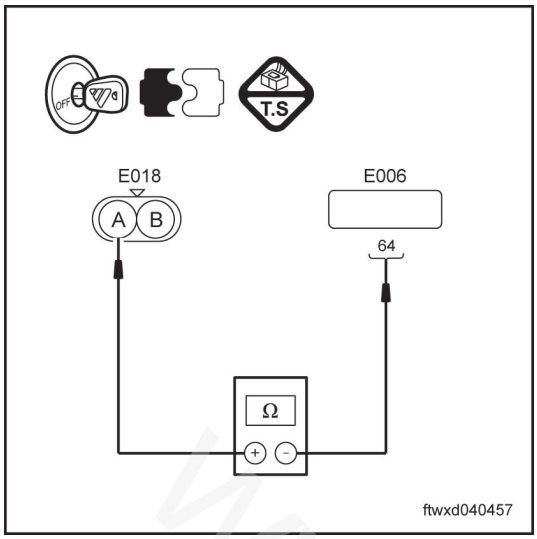
(a) Switch off the ignition.
(b) Disconnect the connector E018 of the carbon pot control valve.
(c) Measure the resistance between the pin A and pin B of the carbon pot control valve.

Check whether the result is normal?

Yes > go to next step.

No > Replace the carbon pot control valve.

2 . Check the resistance of harness between the carbon pot control valve and ECM



(a) Switch off the ignition.
(b) Disconnect the connector E006 of ECM.
(c) Measure the resistance between of the pins of connector E018 of the carbon pot control valve.

Standard voltage

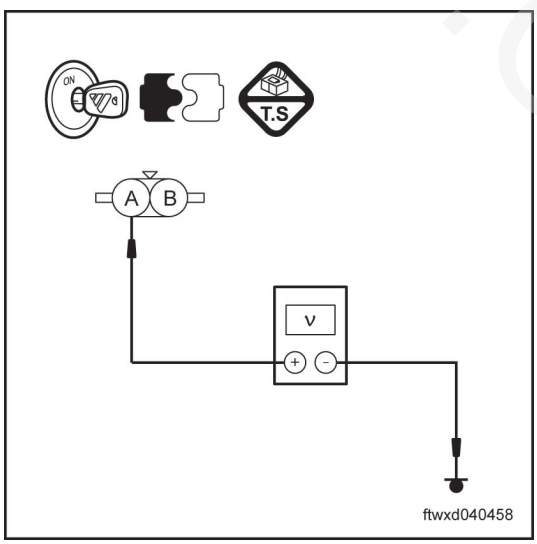
Multimeter Connection	Specified Condition
E018（A）-E006(64)	＜2 Ω

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of the carbon pot control valve.

3 . Check whether the harness of the carbon pot control valve is of short circuit to power supply



(a) Turn the ignition switch to “ON”.
(b) Measure the voltage between of the pin A of connector E018 of carbon pot control valve to ground.

Standard voltage

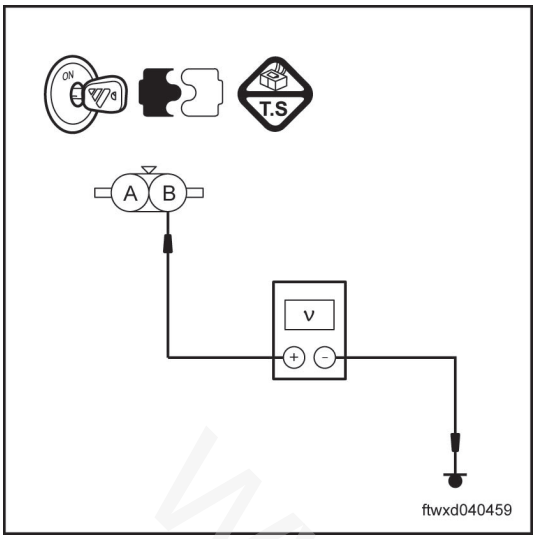
Multimeter Connection	Specified Condition
E018 (A) - ground	0V

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of the carbon pot control valve.

4 . Check the power supply cable voltage of carbon pot control valve



(a) Turn the ignition switch to “ON”.

(b) Measure the voltage between of the pin B of connector E018 of carbon pot control valve to ground.

Standard voltage

Multimeter Connection	Specified Condition
E018（B) - ground	Battery voltage

Check whether the result is normal?

Yes > go to next step.

No > Replace the harness of the carbon pot control valve.

5 . Replace the ECM

(a) Replace the ECM.

(b) Use a diagnostic apparatus to perform DTC verification procedures.

(c) Implement the steps to read sensor data stream.

(d) Verify that no DTC exists and the data are normal.

DEFECTS

If the fault has not been confirmed in DTC (diagnostic trouble code), and is unable to confirm the reason to cause the fault in basic checking, the fault shall be eliminated according to the procedure in the table below, then enter the relevant troubleshooting pages to eliminate the fault.

Gasoline engine control system fault phenomena

Defect		Checking procedure
It is unable to use the diagnostic apparatus to communicate with KT600	KT600 diagnostic apparatus is unable to communicate with ECM	1
Starting	The starter rotates, but the engine is unable to start	2
	The cold car is difficult to start and vehicle body quivers	3
Idling stability (idling is bad)	Unstable idling speed (fluctuating)	4
	The idling speed is too high (the rotational speed of engine is not within specified value)	5
Idling stability (engine stalls)	The engine can stall when it is cold (during idling)	6
	The engine can stall when starting	7
When driving	Slow, maladjusted acceleration response	8
	Poor acceleration and performance	9

Engine control system fault phenomena description

Item		Defect
Starting	It is unable to start	When the starter drives the engine to rotate, there is no combustion phenomena in the cylinder, the engine is unable to start
	Difficult starting	The starter rotates very long before it is able to start
Idling stability (idling is bad)	Idle speed gets unstable	The rotational speed of engine is unable to remain stable
	Idling speed too high	The engine does not operate under the normal idling speed
Idling stability (engine stalls)	The engine can stall when it is cold (during idling)	The engine is apt to stall when it is just started and coolant is at a low temperature
	The engine can stall when starting	The engine stalls as soon as the accelerator pedal is stepped on
When driving	Slow, maladjusted acceleration response	If the vehicle needs to accelerate, the engine rotational speed fails to rise immediately, or acceleration responses slowly, or rotational speed drops temporarily when stepping on the accelerator pedal.
	Poor acceleration and performance	Acceleration efficiency can't reach suitable acceleration according to the throttle position (even though accelerating course is very smooth), or the max vehicle speed can’t be reached

ENGINE PHENOMENA DIAGNOSIS TEST

WARNING

Some phenomena diagnostic procedures require visual and exterior inspection. Every time such visual and exterior inspection shall be carried out firstly. Such inspections can solve one problem and need not further test, and can save precious time.

1 . After receiving a vehicle, shall ask the owner the following problems:

(a) The earliest time that fault appeared.
(b) The engine temperature when the fault occur.
(c) Mileage the vehicle travelled.
(d) Road and habit which the car owner often drives.
(e) The maintenance situation of the car.
(f) The maintenance history of the car.
(g) Has the car been installed additional apparatus? The trouble can be judged tentatively from the above-mentioned understanding, so as to shorten the time for inspection.

2 . Before perform steps of fault diagnostic precedure according to engine phenomena, initial inspection shall be performed first.

(a) Confirm that engine fault indicator lamp can work normally. If abnormal, eliminate trouble of the indicator lamp at first.
(b) Confirm that no engine trouble codes (DTC) are stored in the engine module (ECM). If they exist, refer to corresponding DTC list to eliminate them. Read the trouble codes(both present and historical trouble codes shall be recorded) - clear trouble codes – run (the condition which the trouble occur shall re-appear this time) - read trouble codes again. Read the trouble code list in the servicing manual, refer to the reason, influence and elimination method of the trouble. Intermittent trouble codes can't be ignored.
(c) Use a diagnostic apparatus to check the idling data of heat engine of the electronic control system and confirm that they are within normal scope.
(d) Confirm that the trouble is present, and the reason for causing the trouble exist.
(e) When maintaining the vehicle, maintaining record, the engine cylinder compression pressure, the engine machinery timing, and fuel state shall be confirmed.

3 . External visual inspection

(a) Check the connecting condition of ECM ground (earth).
(b) Check whether the connecting pipe of engine vacuum system splits, distorts and is connected correctly; whether it is flattened or damaged.
(c) Whether the engine oil dipstick, engine oil filling cover are installed correctly.
(d) Check whether ground of the engine (earth) is clean and is fastened firmly.
(e) Check whether the connecting surface of engine gas inlet manifold leak, and whether the sealing surface between the air throttle and gas inlet manifold is in good condition.
(f) Check whether the high-voltage wire for ignition is ruptured, aging, and arranged correctly; whether there is carbon mark. Whether it is in good contact and is fastened firmly.
(g) Check whether there is any leakage in the engine fuel system.
(h) Check whether the engine fuel is deteriorated and contains water.
(i) Check whether the socket connectors of engine sensor and actuators are connected correctly and is fastened firmly.

4 . The accumulated carbon belt which formed on the back of air throttle may directly lead to a series of problems such as bad idling, unstable idling of engine, sometimes explosion sound in the gas inlet manifold, and difficult cold car starting etc..

(a) Carbon accumulates in the air throttle and combustion chamber.

Due to the characteristic of electronic fuel injection engine, the cylinder always injects fuel first and then ignites. Ignition is interrupted at the moment that the engine is stalled, but the

gasoline which is injected in the last circulation can't be reclaimed and can only attach on air inlet valve and the wall of the combustion chamber. Gasoline is very easy to volatilize, but the wax and colloid matter in the gasoline stays, which can accumulate to be thicker and thicker after a long time, and is hardened to form an accumulated carbon while being heated repeatedly.

If the engine burns the engine oil, or impurity which the fuel of low quality contains is too much, then it is more serious that the valve accumulates carbons and the forming speed is faster.

Because the structure of the accumulated carbon is similar to the sponge, a part of the fuel of each time sprayed into the cylinder is absorbed after the accumulated carbon is formed, making the mixing gas thinner which enter into the cylinder, which may lead to such abnormal phenomena as bad engine operation, difficult starting, unstable idling, bad acceleration, emergency refuel backfire, and cheering such anomalies as the flash back, exhaust exceed standard, exhaust gas exceeding the standard, increased fuel consumption etc.. Serious situation can cause that the air inlet valve can't be closed tightly, individual cylinder cannot work completely due to no pressure or even that the air inlet valve is adhered and can't restore. The air inlet valve and piston will produce the movement interference at this moment, and damage the engine finally.

(b) Carbon accumulates on the air intake pipe.

Because each piston of the whole engine does not work simultaneously, when the engine goes out, the air inlet valve of some cylinders can't be totally closed, some unburned fuel is continuously to vaporize and be oxidized, some softer black carbon will be produced in the air intake pipe, especially in the rear part of the air throttle.

On one hand, these accumulated carbon can make tube wall of intake pipe coarser, where the air intake will produce volution, influencing air intake efficiency and the quality of mixing gas.

On the other hand, these accumulated carbon will also block idling path, making idling control unit catching or beyond their adjustment range, such case will cause low idling speed and idling quiver.

5 . Methods to judge accumulated carbon in the cylinder:

(a) Use an inner sight glass to observe the inside condition of the cylinder.

(b) Use a diagnostic apparatus to read the change of the feedback voltage of oxygen sensor, so as to detect indirectly the existence of accumulated carbon.

Once the air inlet valve accumulates carbon, the fluctuation of feedback voltage of oxygen sensor will get largely, for example change from original 0.3-0.7V to 0.1-0.9V. Moreover, the central value of voltage will become large, and varying frequency will slow down at the same time.

(c) Disassembly method:

⚠ CAUTION

If there is too much accumulated carbon in the engine cylinder, cylinder pressure will get higher. But vehicles which have more accumulated carbon often have longer travel mileage, cylinder pressure will drop due to abrasion. So it is not feasible to judge accumulated carbon in the cylinder through cylinder pressure.

6 . To the danger of the accumulated carbon, the following several points should be paid attention to:

(a) Refill high-quality gasoline.

(b) Not to run at idling for a long time.

(c) Run at high speed as possible, try hard to improve the rotational speed of shift gears of the manually shifting vehicles.

KT600 DIAGNOSTIC APPARATUS IS UNABLE TO COMMUNICATE WITH ECM

Symptom	Diagnostic Logic	Possible Cause
KT600 diagnostic apparatus is unable to communicate with ECM	• The power supply is not supplied to ECM • ECM failure • Circuit connection between ECM and KT600 diagnostic apparatus is bad	• The power supply loop of ECM is bad • Circuit between ECM and KT600 diagnostic apparatus is open circuit • ECM

Trouble phenomena diagnostic procedure

1 . Check the data of the engine.

(a) Switch off the ignition.
(b) Connect the analyzer to the diagnostics connector (16-pin) at the lower left of the dashboard.
(c) Switch on the ignition and the analyzer - use the latest software version.
(d) Read the data of the engine on the diagnostic apparatus

Can the diagnostic apparatus enter ECM module to read the dataflow?

Yes > Intermittent trouble exists; refer to the diagnostic help.

No > Go to the next step.

2 . Check other data of the module

(a) Read the data of SRS and ABS on the diagnostic apparatus
(b) Read the data on the diagnostic apparatus

Can the diagnostic apparatus enter the SRS and ABS module to read the dataflow?

Yes > Go to Step 4.

No > Go to the next step.

3 . Check the diagnostic communication line K of ECM

(a) Switch off the ignition.
(b) Disconnect the socket connector of ECM.
(c) Use a multimeter to measure the conduction between the terminal 7 of the diagnostic box C005 and the terminal 75 of ECM.

Resistance: < 2 Ω

(d) Use a multimeter to measure the conduction between the terminal 7 of the diagnostic box C005 and ground.

Resistance: ⩾ 1 MΩ

(e) Turn the ignition switch to ON position, use a multimeter to measure the voltage between the terminal 7 of the diagnostic box C005.

Voltage: 0V

Are the results normal?

Yes > go to next step.

No > maintain the diagnostic communication line K of ECM

4 . Check the power supply of ECM and ground

(a) Check power supply of ECM.
(b) Check the ground of EC.

Are the results normal?

Yes > go to next step.

No > Maintain the power supply of ECM or ground

5 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Read the data of the engine on the diagnostic apparatus Confirm that KT600 diagnostic apparatus is able to communicate with ECM

THE STARTER ROTATES, BUT THE ENGINE IS UNABLE TO START

Symptom	Status	Diagnostic Logic	Possible Cause
The starter can drive the engine to rotate at normal speed, there are obvious signs of ignition, but the engine can't start	• The rotational speed of the crankshaft is normal • Battery is fully recharged • The warning lamp of the engine is normal • When the starter drives the engine to rotate, there is no combustion phenomena in the cylinder, the engine is unable to start	• Faulty spark plug • There is no fuel in the combustion chamber • Incorrect cylinder pressure	There is leakage in the air intake system; fuel pressure is too low; air cleaner is clogged; water temperature sensor is faulty; air flowmeter is faulty; idling control valve or additional air valve are faulty; The injector for cold starting can't work; the injector leaks; incorrect electronic spark timing; the connection circuit of the start switch to the computer is of short circuit; The compression pressure in the cylinder is too low.

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Check the secondary ignition system

(a) Pull out the fuel of the fuel spray nozzle.

(b) Pull out the high-voltage line, unplug the spark plug.

(c) Connect spark plug to the high voltage line, and contact the negative pole of the spark plug with the cylinder body.

(d) Check engine to test secondary ignition system

Correct result: When the engine rotates, strong blue and white spark can be seen on each spark plug.

Check whether the result is normal?

Yes > Go to Step 4.

No > Go to the next step.

3 . Check the secondary ignition system

(a) Check the resistance value of high-voltage coil, and clean the terminals of connector.

Resistance: $\geqslant$ 4 kΩ

(b) Check whether the spark plug accumulates carbons, carbon mark, whether the ceramic insulating part is cracked and leaks electricity; whether the interval is normal; whether the positive and negative poles are burned corrupt; and clean the spark plug.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

4 . Check the sensor of crankshaft position

(a) Use a diagnostic apparatus to read the sensor dataflow of the engine crankshaft position (CKP) shown in the diagnostic apparatus, which shall reach the stipulated value while starting.

Check whether the result is normal?

Yes > go to next step.

No > Check whether the sensor is installed correctly (refer to the engine control system - disassembly and assembly of sensor), maintain or replace the harness, connectors or damaged components.

5 . Check the air throttle:

(a) Press the accelerator pedal gently and start the engine. Check whether the engine can start.

Check whether it can start.

Yes > Check the air throttle and idling path, eliminate accumulated carbon. Unplug the connector of the step motor, measure to check whether the voltage between the terminals is 12 V; when the temperature is at 20 ℃, the normal scope of resistance value shall be 28-33 ohms. Check whether the step motor is clogged, maintain or replace it if necessary.

No > Go to the next step.

6 . Check the absolute pressure/temperature sensor of the engine coolant temperature sensor and intake manifold

(a) Check whether the absolute pressure/temperature sensor of intake manifold is installed correctly.
(b) Remove the absolute pressure/temperature sensor of intake manifold.
(c) Check whether the sensing hole is clogged and the resistance value between every wiring ends comply with the standard.
(d) Check whether the temperature sensor is dirty.
(e) Ignition switch: ON, read the sensor dataflow of coolant temperature and intake manifold absolute pressure (MAP)\ temperature of engine which show in the diagnostic apparatus.

Are the results normal?

Yes > go to next step.

No > Clean, replace faulty components Go to step 11.

7 . Check the power circuit of fuel system

(a) Ignition Switch: ON.
(b) Check whether relay of the fuel pump and fuel pump can work.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the harness of the fuel pump.

8 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Are the results normal?

Yes > Go to Step 10.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

9 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.
(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

10 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ CAUTION

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

When testing the fuel system:

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

11 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 13.

No > Go to the next step.

12 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

13 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.
(b) Observe the change of feedback voltage.
(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

14 . Check the starting signal of the starting switch to the computer

(a) Check whether there is signal of starting switch which is sent to the computer when starting at the position of harness pin.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace faulty components

15 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

THE COLD CAR IS DIFFICULT TO START AND VEHICLE BODY QUIVERS

Symptom	Status	Diagnostic Logic	Possible Cause
The cold car is difficult to start and vehicle body quivers	• The rotational speed of the crankshaft is normal • The warning lamp of the engine is normal • When the cold car starter drives the engine to rotate, it needs many times of starting before it runs.	• Mixing ratio isn’ t right • Carbon accumulates in the air throttle and air intake path. • Faulty coolant temperature sensor • Absolute pressure / temperature sensor, intake manifold • Idle Stepping Motor • Fuel	There is leakage in the air intake system; fuel pressure is too low; air cleaner is clogged; water temperature sensor is faulty; air flowmeter is faulty; idling control valve or additional air valve are faulty; The injector for cold starting can’ t work; the injector leaks; incorrect electronic spark timing; the connection circuit of the start switch to the computer is of short circuit; The compression pressure in the cylinder is too low.

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Check battery

(a) While starting the engine, check the voltage of the battery.

Battery voltage: ⩾ 9.6 V

Check whether the result is normal?

Yes > go to next step.

No > Recharge or replace the battery.

3 . Check the starter

(a) Check whether the starter or the starter circuit is faulty.

Check whether the result is normal?

Yes > go to next step.

No > Eliminate problems, confirm that no more such phenomena.

4 . Check the sensor of crankshaft position

(a) Use a diagnostic apparatus to read the sensor dataflow of the engine crankshaft position (CKP) shown in the diagnostic apparatus, which shall reach the stipulated value while starting.

Check whether the result is normal?

Yes > go to next step.

No > Check whether the sensor is installed correctly (refer to the engine control system - disassembly and assembly of sensor), maintain or replace the harness, connectors or damaged components.

5 . Check the absolute pressure/temperature sensor of the engine coolant temperature sensor and intake manifold

(a) Check whether the absolute pressure/temperature sensor of intake manifold is installed correctly.
(b) Remove the absolute pressure/temperature sensor of intake manifold.
(c) Check whether the sensing hole is clogged and the resistance value between every wiring ends comply with the standard.
(d) Check whether the temperature sensor is dirty.
(e) Ignition switch: ON, read the sensor dataflow of coolant temperature and intake manifold absolute pressure (MAP)\ temperature of engine which show in the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

6 . Check intake system

(a) Check vacuum degree of intake pipe while idling.
(b) Check each fitting, gasket, vacuum hose of the intake pipe, and waste gas circulatory system, fuel evaporation system.
(c) Check whether the filtering core of the air cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

7 . Check the air throttle:

(a) Press the accelerator pedal gently and start the engine. Check whether the engine can start.

Check whether it can start.

Yes > Check the air throttle and idling path, eliminate accumulated carbon. Unplug the connector of the step motor, measure to check whether the voltage between the terminals is 12 V; when the temperature is at 20 ℃, the normal scope of resistance value shall be 28-33 ohms. Check whether the step motor is clogged, maintain or replace it if necessary.

No > Go to the next step.

8 . Check the step motor

(a) When ignition switch is on, the step motor can be checked for expansion.
(b) When ignition switch is off, the step motor can be checked for action; the air throttle opening position shall be the biggest if it is normal.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the connectors, harness or the step motor.

9 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > Go to Step 11.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

10 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.
(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

11 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ **CAUTION**

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

When testing the fuel system:

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

12 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 14.

No > Go to the next step.

13 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

14 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.
(b) Observe the change of feedback voltage.
(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

15 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

UNSTABLE IDLING SPEED

Symptom	Status	Diagnostic Logic	Possible Cause
Unstable idling speed	The rotational speed of engine is unable to remain stable	• Ignition System • Air-fuel ratio • Faulty step motor • Compression pressure too low	• Ignition System • Air-fuel ratio • Faulty step motor • Compression pressure too low • Reverse installation of front and rear oxygen sensors

⚠ CAUTION

When the engine runs at idling, if individual cylinder can't work due to maladjusted, mixed air and agent ratio, air intake system leakage or faulty ignition system, it will lead to the faults such as no idling, too high idling speed, unstable idling and bad high idling etc..

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Carry out visual and exterior inspection

(a) Observe the situation of the engine operation and the intensity of quivering.
(b) Meanwhile, observe the swing range of the engine speedometer indicator, check the rotational speed is out of the specified range of idling speed.
(c) Observe it is a normal quivering or a loaded idling one. (Opening air conditioner, light, changing gear, operating steering wheel, etc.)
(d) Check whether the external components of the engine are of abnormal state; Whether the vacuum tube has come off or damaged; Whether the wire connector has come off.
(e) Check whether there are oil leakage, water leakage, gas leakage, leakage of electricity.
(f) Check whether there are abnormal phenomena such as sound which shows bad combustion, black smoke, smell of fresh gasoline, etc..

Check whether the result is normal?

Yes > go to next step.

No > Eliminate external problems, confirm that no more such phenomena.

3 . Check the air throttle body and step motor

(a) Check whether there are greasy dirt, charcoal on the air throttle and the air throttle is clogged; whether there are dirt and charcoal on the air intake path nearby; whether there is charcoal on the step motor.
(b) Start the engine in idling.
(c) Use a diagnostic apparatus to carry out step motor test.
(d) When the diagnostic apparatus control the step motor to rotate telescopically, the speed of the engine can fluctuate synchronously. (You can feel it by touching the step motor with hand)
(e) Unplug the connector of the step motor, measure whether there is 12 V voltage between the connector ends.

(f) When ignition switch is on, the step motor can be checked for expansion.
(g) When ignition switch is off, the step motor can be checked for action.

Check whether the result is normal?

Yes > go to next step.

No > Wash, maintain or replace the harness, connectors or the step motor.

4 . Check engine ignition system

(a) Make the engine run at idling, stall cylinders one by one, observe whether the engine speed change.
(b) When each cylinder stalls, the rotational speed of engine should drop evidently or quiver simultaneously.

Check whether the result is normal?

Yes > Go to Step 11.

No > Go to the next step.

5 . Check the secondary ignition system

(a) Check the resistance value of high-voltage coil, and clean the terminals of connector.

Resistance: ⩾ 4 kΩ

(b) Check whether the spark plug accumulates carbons, carbon mark, whether the ceramic insulating part is cracked and leaks electricity; whether the interval is normal; whether the positive and negative poles are burned corrupt; and clean the spark plug.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

6 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ CAUTION

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

When testing the fuel system:

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

7 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > Go to step 9.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

8 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.
(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

9 . Check the air intake and exhaust system

(a) Check whether there is leakage in the engine air intake system
(b) Check whether there are coming off, fracture, distortion, aged sealing on the intake pipe.
(c) Grip the vacuum booster hose, or stop it after pulling out, observe whether there is change in idling.
(d) Check whether there is gas leakage sound of " whistling " in the air intake pipe when the engine is operating.
(e) Check whether there is leakage in the hose of crankshaft box forced ventilation valve (PCV), then check whether PCV is opened too large.
(f) Check whether there is leakage in the vacuum tube of the evaporation emission control system.
(g) Check whether the vacuum hose of the fuel pressure regulator is damaged, come off or cracked.
(h) Check whether the three-way catalytic converter is blocked.
(i) Check whether the sealing of the air throttle leak.
(j) Check whether the intake manifold gasket leaks.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace faulty components

10 . Check the absolute pressure/temperature sensor of the engine coolant temperature sensor and intake manifold

(a) Check whether the absolute pressure/temperature sensor of intake manifold is installed correctly.
(b) Remove the absolute pressure/temperature sensor of intake manifold.
(c) Check whether the sensing hole is clogged and the resistance value between every wiring ends comply with the standard.
(d) Check whether the temperature sensor is dirty.
(e) Ignition switch: ON, read the sensor dataflow of coolant temperature and intake manifold absolute pressure (MAP)\ temperature of engine which show in the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

11 . Check the oxygen sensor,

(a) Check whether front and rear oxygen sensors are installed properly.

(b) Make the engine run at idling, check the dataflow of the diagnostic apparatus, observe whether oxygen sensor work normally after the cooling liquid reach normal temperature to activate closed loop control.

Normal data of oxygen sensor: Fluctuate normally between 0-1 V. There are 8 times of the alternate changes of maximum and minimum values within 10 seconds.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace faulty components

12 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 14.

No > Go to the next step.

13 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

14 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.

(b) Observe the change of feedback voltage.

(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

15 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

IDLING SPEED TOO HIGH

Symptom	Status	Diagnostic Logic	Possible Cause
The idling speed is too high (the rotational speed of idling is not within specified value)	The engine’s rotational speed is too high	The reason may be that there is too much air inflow during idling	• Faulty idling stepping motor • Vacuum leakage • Too tight throttle valve cable • Faulty air throttle body • ECM

⚠ **CAUTION**

When the engine runs at idling, if individual cylinder can’t work due to maladjusted, mixed air and agent ratio, air intake system leakage or faulty ignition system, it will lead to the faults such as no idling, too high idling speed, unstable idling and bad high idling etc..

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Carry out visual and exterior inspection

(a) Carry out visual and exterior inspection

Check whether the result is normal?

Yes > go to next step.

No > Eliminate external problems, confirm that no more such phenomena.

3 . Check intake system

(a) Check whether there is leakage in the engine air intake system

(b) Check whether there is gas leakage sound of " whistling " in the air intake pipe when the engine is operating.

(c) Check whether there is coming off, fracture, distortion, aged sealing on the intake pipe.

Check whether there is coming off, fracture and distortion; Are the results normal?

Yes > go to next step.

No > Maintain, replace or reinstall.

4 . Check relevant components

(a) Check whether the vacuum hose of the carbon pot control valve is connected reliably or is damaged.

(b) Check whether the vacuum regulating hose of the fuel pressure regulator is installed reliably or is damaged.

(c) Check whether the vacuum hose of the crankshaft box which is used for forced ventilation is installed reliably or is damaged.

(d) Check whether the vacuum tube of the braking system is installed reliably or is damaged.

Check whether the result is normal?

Yes > go to next step.

No > Adjust or replace

5 . Check the air throttle body and step motor

(a) Check whether the throttle valve cable is too tight.
(b) Check whether there are greasy dirt, charcoal on the air throttle and the air throttle is clogged; whether there are dirt and charcoal on the air intake path nearby; whether there is charcoal on the step motor.
(c) Start the engine in idling.
(d) Use a diagnostic apparatus to carry out step motor test.
(e) When the diagnostic apparatus control the step motor to rotate telescopically, the speed of the engine can fluctuate synchronously. (You can feel it by touching the step motor with hand)
(f) Unplug the connector of the step motor, measure whether there is 12 V voltage between the connector ends.
(g) When ignition switch is on, the step motor can be checked for expansion.
(h) When ignition switch is off, the step motor can be checked for action.

Check whether the result is normal?

Yes > go to next step.

No > Wash, maintain or replace the harness, connectors or the step motor.

6 . Check the absolute pressure/temperature sensor of the engine coolant temperature sensor and intake manifold

(a) Check whether the absolute pressure/temperature sensor of intake manifold is installed correctly.
(b) Remove the absolute pressure/temperature sensor of intake manifold.
(c) Check whether the sensing hole is clogged and the resistance value between every wiring ends comply with the standard.
(d) Check whether the temperature sensor is dirty.
(e) Ignition switch: ON, read the sensor dataflow of coolant temperature and intake manifold absolute pressure (MAP)\ temperature of engine which show in the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

7 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace the components or circuit of the fuel system.

8 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ CAUTION

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

When testing the fuel system:

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

9 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")

(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

THE ENGINE CAN STALL WHEN IT IS COLD

Symptom	Status	Diagnostic Logic	Possible Cause
The engine can stall when it is cold	The rotational speed of engine is unable to remain stable	• Ignition System • Air-fuel ratio • Faulty step motor • Compression pressure too low	• Faulty ignition system • Idling air – fuel ratio control system failure • Faulty air intake system • Compression pressure too low • Faulty discharge control system • ECM

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Carry out visual and exterior inspection

(a) Observe the situation of the engine operation and the intensity of quivering.

(b) Observe the swing range of the engine speedometer indicator and the rotational speed while stalling at the same time.

(c) Observe it is normal idling stalling or loaded idling stalling(opening air-conditioner, lights, gear position, turning turn wheel etc.)

(d) Check whether the external components of the engine are of abnormal state; Whether the vacuum tube has come off or damaged; Whether the wire connector has come off.

Check whether the result is normal?

Yes > go to next step.

No > Eliminate abnormal problems, confirm that no more such phenomena.

3 . Check the air throttle body and step motor

(a) Check whether there are greasy dirt, charcoal on the air throttle and the air throttle is clogged; whether there are dirt and charcoal on the air intake path nearby; whether there is charcoal on the step motor.

(b) Start the engine in idling.

(c) Use a diagnostic apparatus to carry out step motor test.

(d) When the diagnostic apparatus control the step motor to rotate telescopically, the speed of the engine can fluctuate synchronously. (You can feel it by touching the step motor with hand)

(e) Unplug the connector of the step motor, measure whether there is 12 V voltage between the connector ends.

(f) When ignition switch is on, the step motor can be checked for expansion.

(g) When ignition switch is off, the step motor can be checked for action.

Check whether the result is normal?

Yes > go to next step.

No > Wash, maintain or replace the harness, connectors or the step motor.

4 . Check the coolant temperature sensor

(a) Check whether the resistance value between every wiring end of cooling liquid temperature sensors comply with the standard.
(b) Check whether the cooling liquid temperature sensor is polluted.
(c) Ignition switch: ON, read the dataflow of the cooling liquid temperature sensor of the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

5 . Check the air intake temperature sensor

(a) Check whether the resistance value between every wiring end of air intake temperature sensors comply with the standard.
(b) Check whether the air intake temperature sensor is polluted.
(c) Ignition switch: ON, read the dataflow of the air intake temperature sensor of the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

6 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ CAUTION

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

When testing the fuel system:

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

7 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > Go to Step 9.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

8 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.
(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

9 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 11.

No > Go to the next step.

10 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

11 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.
(b) Observe the change of feedback voltage.
(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

12 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")

(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

THE ENGINE CAN STALL WHEN STARTING

Symptom	Status	Diagnostic Logic
The engine can stall when starting	Engine stalls during starting if the accelerator pedal is stepped	Insufficient temporary power for starting • Faulty idling stepping motor • Faulty air throttle • Faulty oil injector • Faulty ignition system • Poor load signal • ECM

⚠ **CAUTION**

If the engine quivers when starting in idling mode, the rotational speed drops, it is apt to stall. The reason for the fault shall be found from idling control.

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Carry out visual and exterior inspection

(a) Observe the situation of the engine operation and the intensity of quivering.

(b) Observe the swing range of the engine speedometer indicator and the rotational speed while stalling at the same time.

(c) Observe it is normal idling stalling or loaded idling stalling(opening air-conditioner, lights, gear position, turning turn wheel etc.)

(d) Check whether the external components of the engine are of abnormal state; Whether the vacuum tube has come off or damaged; Whether the wire connector has come off.

Check whether the result is normal?

Yes > go to next step.

No > Eliminate abnormal problems, confirm that no more such phenomena.

3 . Check the air throttle body and step motor

(a) Check whether there are greasy dirt, charcoal on the air throttle and the air throttle is clogged; whether there are dirt and charcoal on the air intake path nearby; whether there is charcoal on the step motor.

(b) Start the engine in idling.

(c) Use a diagnostic apparatus to carry out step motor test.

(d) When the diagnostic apparatus control the step motor to rotate telescopically, the speed of the engine can fluctuate synchronously. (You can feel it by touching the step motor with hand)

(e) Unplug the connector of the step motor, measure whether there is 12 V voltage between the connector ends.

(f) When ignition switch is on, the step motor can be checked for expansion.

(g) When ignition switch is off, the step motor can be checked for action.

Check whether the result is normal?

Yes > go to next step.

No > Wash, maintain or replace the harness, connectors or the step motor.

4 . Check the air throttle position

(a) Use a diagnostic apparatus to check whether the air throttle is normal.
(b) Check whether the air throttle position change is normal after stepping on the accelerator pedal.

Check whether the result is normal?

Yes > go to next step.

No > adjust the air throttle position

5 . Check the secondary ignition system

(a) Pull out the fuel of the fuel spray nozzle.
(b) Pull out the high-voltage line, unplug the spark plug.
(c) Connect spark plug to the high voltage line, and contact the negative pole of the spark plug with the cylinder body.
(d) Check engine to test secondary ignition system

Correct result: When the engine rotates, strong blue and white spark can be seen on each spark plug.

Check whether the result is normal?

Yes > Go to Step 7.

No > Go to the next step.

6 . Check the secondary ignition system

(a) Check the resistance value of high-voltage coil, and clean the terminals of connector.

Resistance: $\geqslant$ 4 kΩ

(b) Check whether the spark plug accumulates carbons, carbon mark, whether the ceramic insulating part is cracked and leaks electricity; whether the interval is normal; whether the positive and negative poles are burned corrupt; and clean the spark plug.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

7 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ CAUTION

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

When testing the fuel system:

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

8 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > Go to Step 10.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

9 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.

(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

10 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 12.

No > Go to the next step.

11 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

12 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.
(b) Observe the change of feedback voltage.
(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

13 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

SLOW, MALADJUSTED ACCELERATION RESPONSE

Symptom	Status	Diagnostic Logic	Possible Cause
Slow, maladjusted acceleration response	The engine rotational speed fails to rise immediately, or acceleration responses slowly, or rotational speed drops temporarily when stepping on the accelerator pedal	Bad air-fuel ratio or compression pressure	• Air-fuel ratio control system failure • Fuel supply system failure • Compression pressure too low • ECM

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Check intake system

(a) Check each fitting, gasket, vacuum hose of the intake pipe, and waste gas circulatory system, fuel evaporation system.

(b) Check whether the filtering core of the air cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

3 . Check engine idling

(a) Check whether the engine idling is normal.

Check whether the result is normal?

Yes > go to next step.

No > refer to the engine phenomenon diagnosis table – eliminate idle speed trouble, confirm that no more such phenomena.

4 . Check the absolute pressure/temperature sensor of the engine coolant temperature sensor and intake manifold

(a) Check whether the absolute pressure/temperature sensor of intake manifold is installed correctly.

(b) Remove the absolute pressure/temperature sensor of intake manifold.

(c) Check whether the sensing hole is clogged and the resistance value between every wiring ends comply with the standard.

(d) Check whether the temperature sensor is dirty.

(e) Ignition switch: ON, read the sensor dataflow of coolant temperature and intake manifold absolute pressure (MAP)\ temperature of engine which show in the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

5 . Check the air throttle position

(a) Use a diagnostic apparatus to check whether the air throttle is normal.
(b) Check whether the air throttle position change is normal after stepping on the accelerator pedal.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace faulty components

6 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ **CAUTION**

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

7 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > Go to Step 9.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

8 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.
(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

9 . Check exhaust system

(a) Check exhaust system and three-way catalytic converter.
(b) Use the exhaust back pressure gauge to check whether the tailpipe is clogged.

10 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 12.

No > Go to the next step.

11 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

12 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.
(b) Observe the change of feedback voltage.
(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

13 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

POOR ACCELERATION AND PERFORMANCE

Symptom	Status	Diagnostic Logic	Possible Cause
Poor acceleration and performance	Acceleration efficiency can't reach suitable acceleration according to the throttle position (even though accelerating course is very smooth), or the max vehicle speed can't be reached, the engine misfire, backfire, while accelerating, or the vehicle stops suddenly, there are fluctuations in the speed	The ignition system may be poor in air-fuel ration or compression pressure	• Faulty ignition system • Air-fuel ratio control system failure • Fuel supply system failure • Compression pressure too low • Exhaust System is clogged • ECM

Trouble phenomena diagnostic procedure

1 . Check engine fault indicator lamp and DTC

(a) Use a diagnostic apparatus to perform procedure for reading DTC.

Is there DTC?

Yes > refer to DTC list, carry out DTC trouble diagnostic procedure.

No > Go to the next step.

2 . Carry out visual and exterior inspection

(a) Perform external visual inspection.
(b) Check whether the manual brake is loose.
(c) Check the clutch for slippage.
(d) Check whether the positioning of the four wheels is proper.
(e) Check whether the tire model is right and air pressure is normal.
(f) Check whether the braking system is normal, eliminate braking drag, ensure that the braking branch pump can restore its position, eliminate ABS trouble.

Check whether the result is normal?

Yes > go to next step.

No > Eliminate external problems, confirm that no more such phenomena.

3 . Check the air throttle position

(a) Use a diagnostic apparatus to check whether the air throttle is normal.
(b) Check whether the air throttle position change is normal after stepping on the accelerator pedal.

Check whether the result is normal?

Yes > go to next step.

No > Maintain or replace faulty components

4 . Check the absolute pressure/temperature sensor of the engine coolant temperature sensor and intake manifold

(a) Check whether the absolute pressure/temperature sensor of intake manifold is installed correctly.
(b) Remove the absolute pressure/temperature sensor of intake manifold.

(c) Check whether the sensing hole is clogged and the resistance value between every wiring ends comply with the standard.
(d) Check whether the temperature sensor is dirty.
(e) Ignition switch: ON, read the sensor dataflow of coolant temperature and intake manifold absolute pressure (MAP)\ temperature of engine which show in the diagnostic apparatus.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

5 . Check the pressure of the fuel system

(a) Check the pressure of the fuel system Refer to "Chapter 12A. Fuel system- precaution")

Check whether the result is normal?

Yes > Go to Step 9.

No > Maintain or replace the components or circuit of the fuel system, if fuel pressure is lower than 400 kPa, and go to next step.

6 . Check the fuel supply of the fuel system

(a) Check for leakage in the fuel intake pipe.
(b) Check whether the gasoline cleaner is clogged.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

7 . Check the injector

(a) Pull out the connector of the injector.
(b) Pull out the fuel delivery pipe and injector together.
(c) Directly apply battery 12V voltage to the injector.
(d) Each injector shall inject standard volume of fuel, and it shall be pulverized evenly.

⚠ CAUTION

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

! DANGER

While checking the spraying state of the injector, if spraying looks like a " column " instead of a “cone”, or the injectors of the four cylinders inject different volumes of fuel (difference greater than 5ml), injectors shall be replaced. Check whether there is colloidal material in the injector nozzle, if yes, it shall be soaked in detergent and sprayed, otherwise it will lead to insufficient injected fuel quantity or poor acceleration, etc.

- **Put a mark " caution: Flammable " in the working area.**
- **Jobs shall be carried out in well-ventilated area, and a carbon dioxide fire extinguisher shall be equipped.**
- **Smoking shall be strictly forbidden while carrying out work which is relevant to the fuel system. The working area shall be far away from flame and spark.**
- **Put the discharged fuel in explosion-proof containers.**

Check whether the result is normal?

Yes > go to next step.

No > Clean injector Recheck the working state of the fuel injector If the injector still works abnormally, change it.

8 . Check the secondary ignition system

(a) Pull out the fuel of the fuel spray nozzle.

(b) Pull out the high-voltage line, unplug the spark plug.

(c) Connect spark plug to the high voltage line, and contact the negative pole of the spark plug with the cylinder body.

(d) Check engine to test secondary ignition system

Correct result: When the engine rotates, strong blue and white spark can be seen on each spark plug.

Check whether the result is normal?

Yes > Go to Step 10.

No > Go to the next step.

9 . Check the secondary ignition system

(a) Check the resistance value of high-voltage coil, and clean the terminals of connector.

Resistance: ⩾ 4 kΩ

(b) Check whether the spark plug accumulates carbons, carbon mark, whether the ceramic insulating part is cracked and leaks electricity; whether the interval is normal; whether the positive and negative poles are burned corrupt; and clean the spark plug.

Check whether the result is normal?

Yes > go to next step.

No > Clean, replace faulty components

10 . Check the pressure of the cylinders

(a) Carry out compression pressure test for the cylinders.

The pressure of each cylinder: 1270 kPa

The limit value of each cylinder: 880 kPa

The difference of limit value of cylinders: Can't exceed 25%

Check whether the result is normal?

Yes > Go to Step 12.

No > Go to the next step.

11 . Check engine for automatic timing

(a) Check whether the mark of engine timing gear is aligned, damaged, whether the belt becomes loose or jump tooth.

Check whether the result is normal?

Yes > go to next step.

No > Carry out timing belt aligning operation or change the timing belt.

12 . Check the machine of the engine.

(a) Use an inner sight glass to observe the inside condition of the cylinder.
(b) Observe the change of feedback voltage.
(c) Disintegrate the engine and maintain the interior trouble.

Clean accumulated carbon or dismantle and check the engine cylinder cover. Check the air throttle, air intake manifold for accumulated carbon. For instance: cylinder is not sealed tightly due to too big clearance between the piston-ring and cylinder body, the cylinder cushion leaks, the valve conduit becomes loose, the valve is not be closed tightly, the valve accumulates carbon.

Check whether the result is normal?

Yes > go to next step.

No > Maintain the interior trouble of the engine.

13 . Replace the ECM

(a) Replace the ECM. (Refer to "Chapter 11. Engine Control System - engine control module")
(b) Check the engine dataflow, and confirm that no more such engine phenomena, and the system is normal.

SRS SYSTEM

PRECAUTION

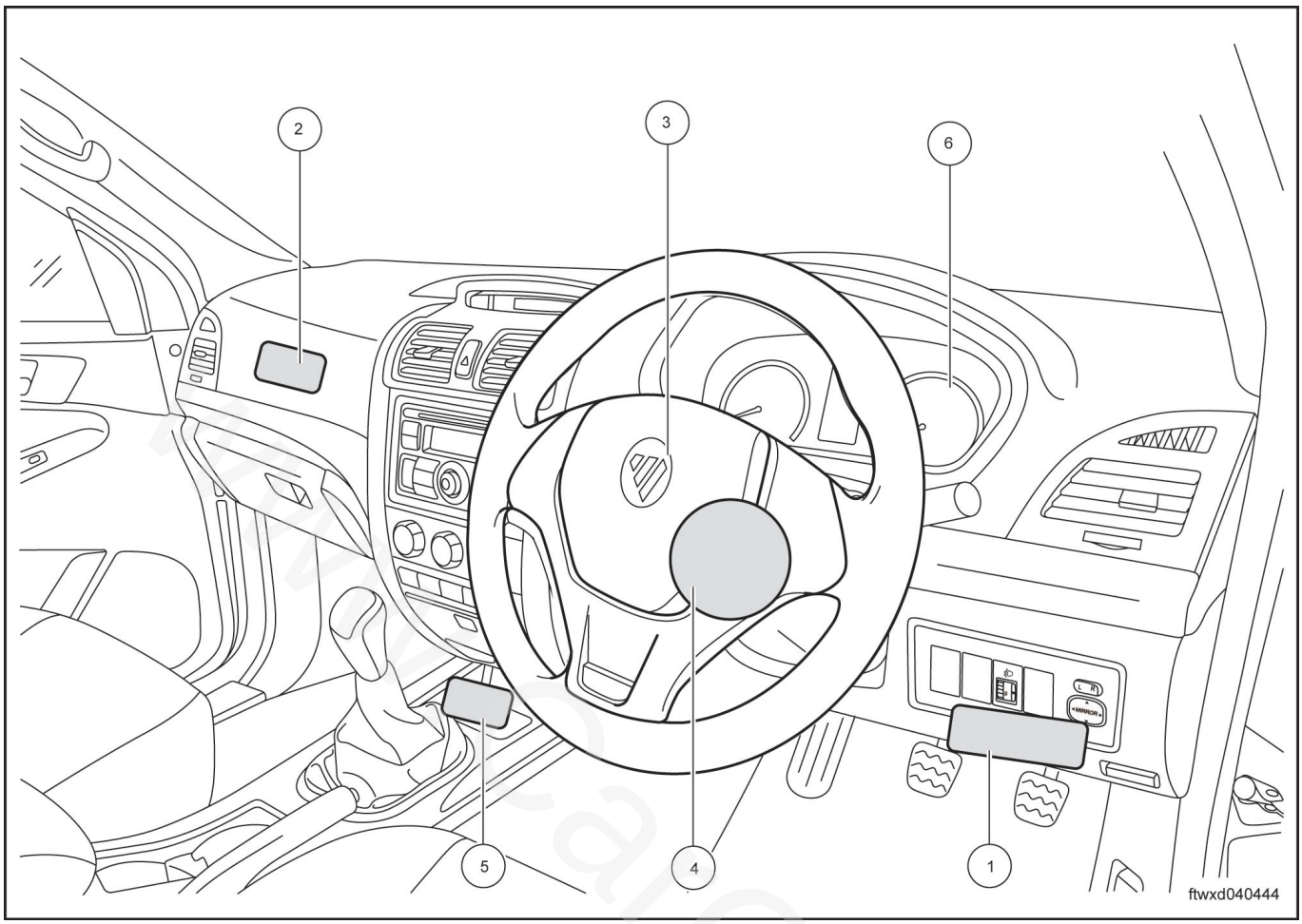
! DANGER

This model equipped with SRS system. Failure to carry out service operations in the correct sequence may cause the SRS to unexpectedly deploy during servicing, or even lead to critical accident. Furthermore, an operational mistake may also prevent the SRS from normal operations. Operation can only be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) cable and the positive (+) cable are disconnected from the battery. (The SRS is equipped with backup power supply. Therefore, if any operation is taken within 90 seconds after disconnecting the battery negative (-) cable and positive (+) cable, the SRS may deploy suddenly.) Do not expose the horn button assembly to heat or open fire.

⚠ CAUTION

Since it is difficult to identify the failure of the SRS, Diagnostic Trouble Code (DTC) is an essential source of information during troubleshooting. Thus, when troubleshooting the SRS, be sure to remember to check the DTCs before disconnecting the battery. Even after a minor impact that the SRS assembly does not deploy, it is always important to check the horn button assembly and airbag ECU. In case impact may be caused on SRS control module when conducting maintenance, do remember to disconnect SRS control module ECM first. Never use any SRS part removed from another vehicle. If replacement is required, be sure to use new spare parts. Do not disassemble the horn button assembly. If the horn button assembly has been dropped, or there are cracks, dents or other faults on the housing, replace it with a new one. Use a multimeter with high resistance to troubleshoot the SRS electrical circuits. During servicing, be sure to follow the instructions on the labels attached to the SRS components. After repairing the SRS, remember to check the airbag indicator lamp. When the negative (-) cable is disconnected from the battery, the memory of the clock and the radio system will be reset. So before repairing, record all necessary data. At the end of repairing, reset the radio system and the clock. Never use any backup power supply from another vehicle, which may reset the memory of the systems. The backup power supply will power up the SRS, which may unexpectedly deploy the airbag during servicing.

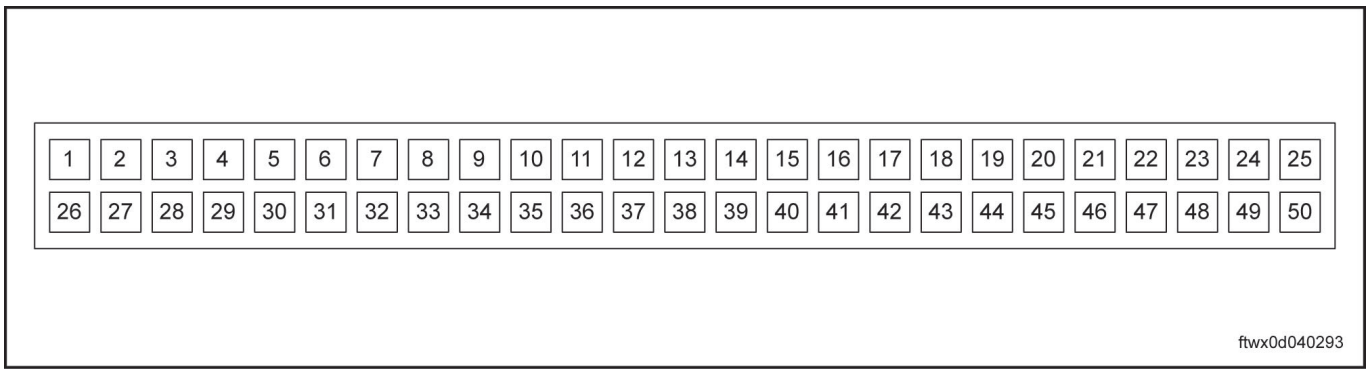
COMPONENTS DRAWING



1	Automobile body fuse box
2	Passenger SRS assembly
3	Horn button assembly

4	Clock Spring
5	Airbag Control Module
6	Assembly instrument

SRS CONTROL MODULE CONNECTOR



Number	Definition	Colour	Number	Definition	Colour
1	-	-	26	-	-
2	-	-	27	-	-
3	-	-	28	-	-
4	-	-	29	-	-
5	Switch Power	Yellow-white	30	lock catch switch input, driver seat belt	Black-Red
6	ground	Black	31	-	-
7	-	-	32	-	-
8	-	-	33	CAN L	Blue-yellow
9	-	-	34	CAN H	Red-white
10	Main air bag+, operator's seat	brown	35	-	-
11	Main air bag+, operator's seat	Brown-red	36	-	-
12	-	-	37	lock catch switch input, driver seat belt	Yellow-black
13	Preloading, driver’s seat belt	Brow-yellow	38	-	-
14	Preloading, driver’s seat belt	Brown-green	39	-	-
15	-	-	40	-	-
16	Preloading, assistant driver’s seat belt	Green-black	41	-	-
17	Preloading, assistant driver’s seat belt	Green-red	42	-	-
18	Main air bag+, assistant driver's seat	green	43	-	-

Number	Definition	Colour	Number	Definition	Colour
19	Main air bag+, assistant driver's seat	Yellow	44	-	-
20	-	-	45	-	-
21	-	-	46	-	-
22	-	-	47	-	-
23	-	-	48	-	-
24	-	-	49	-	-
25	-	-	50	-	-

DIAGNOSTIC DTC CODE LIST

⚠ **CAUTION**

When checking DTC in the checking module, if certain DTC displayed, then the circuit of the code listed in the following list should be checked. The detailed description of each DTC can refer to corresponding pages.

DTC code	Diagnostic items (DTC definition)	Trouble location
B1101	Over-high power supply voltage	• Battery • Charging system • Systematic power supply
B1102	Over-low power supply voltage	• fuse • Systematic power supply • SRS Control Module
B1346	High resistance , driver’s Air bag igniter	• SRS circuit, driver • Driver’s SRS Assembly • SRS Control Module
B1347	Low resistance , driver’s Air bag igniter	• SRS circuit, driver • Driver’s SRS Assembly • SRS Control Module
B1348	Ground, driver’s Air bag igniter	• SRS circuit, driver • Driver’s SRS Assembly • SRS Control Module
B1349	Battery, driver’s Air bag igniter	• SRS circuit, driver • Driver’s SRS Assembly • SRS Control Module
B1352	High resistance, assistant driver’s Air bag igniter	• SRS system circuit, assistant driver • Assistant driver’s SRS Assembly • SRS Control Module
B1353	Low resistance, assistant driver’s Air bag igniter	• SRS system circuit, assistant driver • Assistant driver’s SRS Assembly • SRS Control Module
B1354	Ground, assistant driver’s air bag igniter	• SRS system circuit, assistant driver • Assistant driver’s SRS Assembly • SRS Control Module
B1355	Battery, assistant driver’s air bag igniter	• SRS system circuit, assistant driver

DTC code	Diagnostic items (DTC definition)	Trouble location
		• Assistant driver’s SRS Assembly • SRS Control Module
B1361	High resistance of the preloading igniter, driver’s seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • SRS Control Module
B1362	Low resistance of the preloading igniter, driver’s seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • SRS Control Module
B1363	Ground of the preloading igniter, driver’s seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • SRS Control Module
B1364	Battery of the preloading igniter, driver’s seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • SRS Control Module
B1367	High resistance of the preloading igniter, assistant driver’s seat belt	• Preloading circuit, assistant driver’s seat belt • Preloading assembly, assistant driver’s seat belt • SRS Control Module
B1368	Preloading igniter ground, assistant driver’s seat belt	• Preloading circuit, assistant driver’s seat belt • Preloading assembly, assistant driver’s seat belt • SRS Control Module
B1369	Preloading igniter battery, driver’s seat belt	• Preloading circuit, assistant driver’s seat belt • Preloading assembly, assistant driver’s seat belt • SRS Control Module
B1370	Preloading igniter battery, driver’s seat belt	• Preloading circuit, assistant driver’s seat belt • Preloading assembly, assistant driver’s seat belt • SRS Control Module

DEFECT PHENOMENON FORM

⚠ **CAUTION**

If defects code fails to appear when checking DTC, and the components of the system don’t work normally, check the circuit in line with the defect phenomenon listed in the following form.

When replacing SRS control module, assembly instrument and so on, turn the ignition switch to “OFF”, and disconnect negative(-) cable of the battery. Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in order and replace the part if necessary.

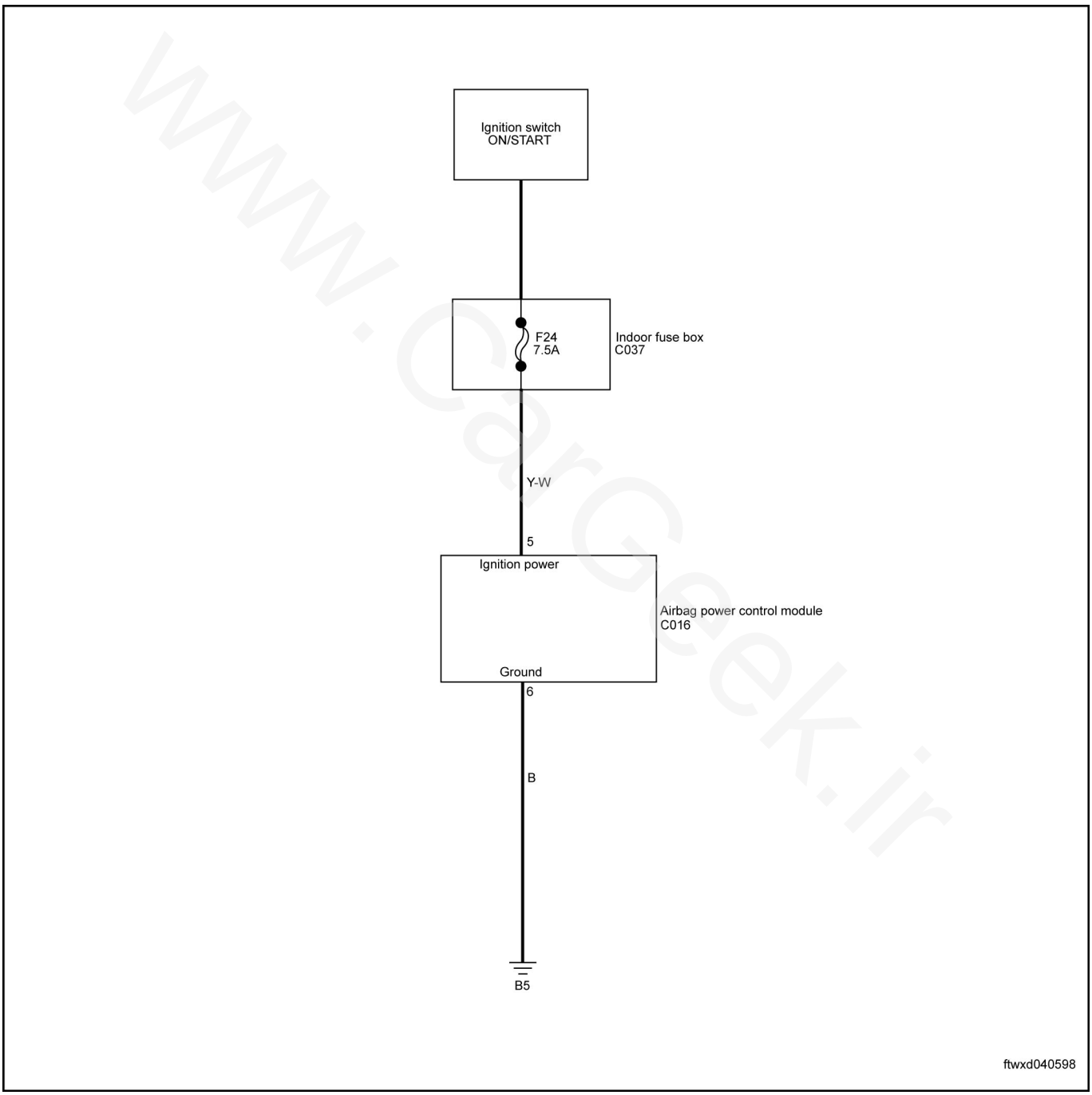
Defect phenomenon	Trouble location	Reference
SRS indictor light is constantly on.	1. Indicator light circuit, SRS	Chapter4, Diagnosis of SRS system and the indicator light of SRS is constantly on.
	2. SRS Control Module	Chapter4, Diagnosis of SRS system and the indicator light of SRS is constantly on.
SRS indictor light is off.	1. Indicator light circuit, SRS	Chapter4, Diagnosis of SRS system and the indicator light of SRS is off.
	2. SRS Control Module	Chapter4, Diagnosis of SRS system and the indicator light of SRS is off.

B 1102 OVER-LOW THE POWER SUPPLY VOLTAGE

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1102	• If the speed of the vehicle is 3 kilometer/hour, the voltage of ignition switch is 10V or lower than 10 seconds or longer time.	• fuse • Systematic power supply • SRS Control Module

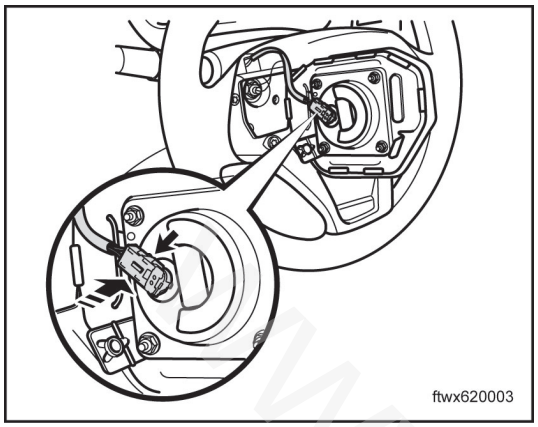
Circuit diagram



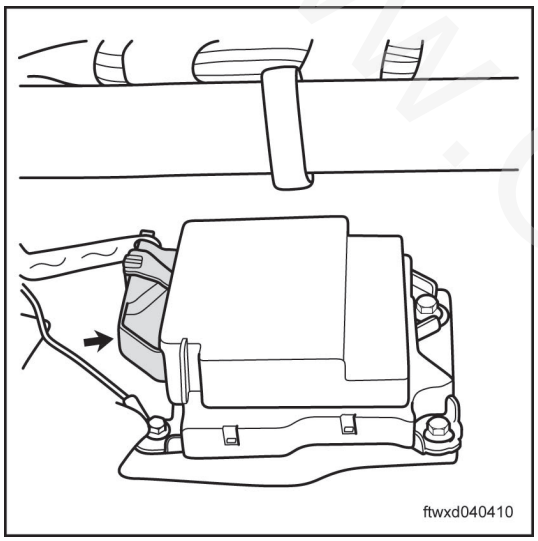
Diagnostic steps

1 . Check harness (SRS control module-lock spring)

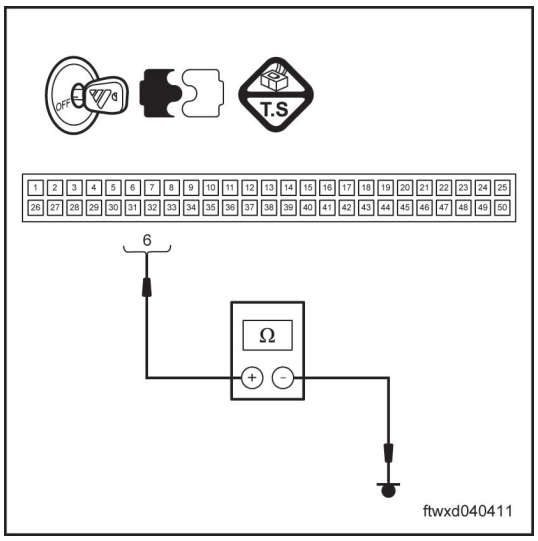
(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Disconnect the connector of lock spring C009.



(c) Disconnect SRS control module connector C016.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016 (6) ground	< 2 Ω

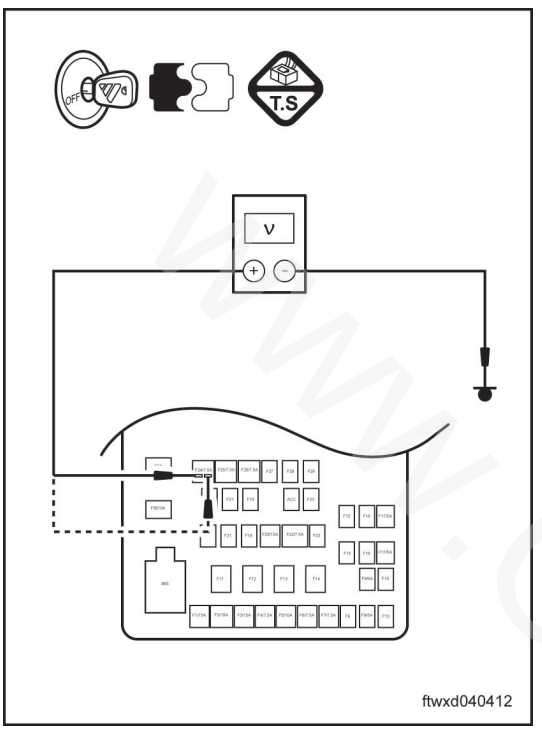
Check whether the result is normal?

Yes> go to step 2

No > Maintenance or replace harness.

2 . Check fuse and relay (vehicle body fuse box)

(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) When ignition switch is on, check fuse F24 of the fuse box on the vehicle body.

Standard voltage

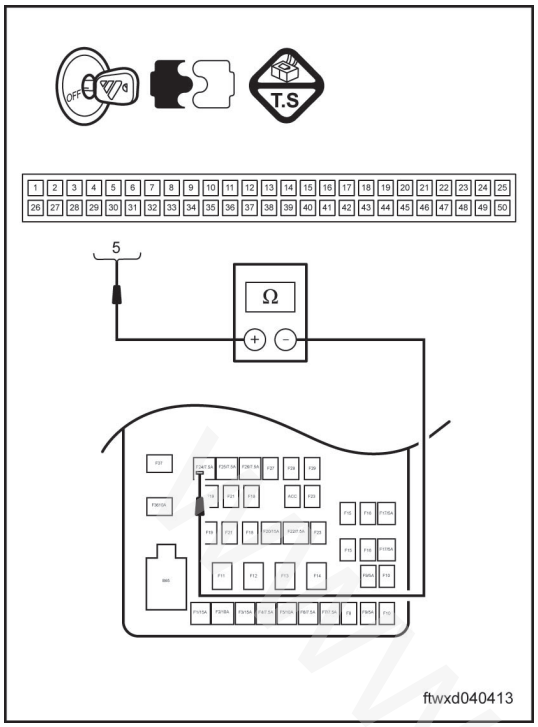
Multimeter connection	Standard value
F24-ground	Battery voltage
F24-ground	

Check whether the result is normal?

Yes> go to step 3

No> replace fuse

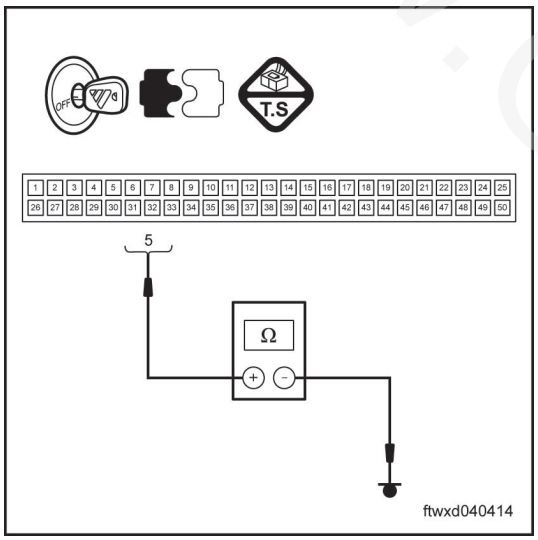
3 . Check the harness (fuse box of vehicle body-SRS control module)



(a) When ignition switch is off, pull out fuse F24 of the fuse box and check the resistance value between the connector C016 for the fuse box and SRS control module.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016（5）-F24	＜2 Ω



(b) Check the resistance between SRS control module connector C016 and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C016 (5) ground	⩾ 1 MΩ

Check whether the result is normal?

Yes> Replace SRS Control Module

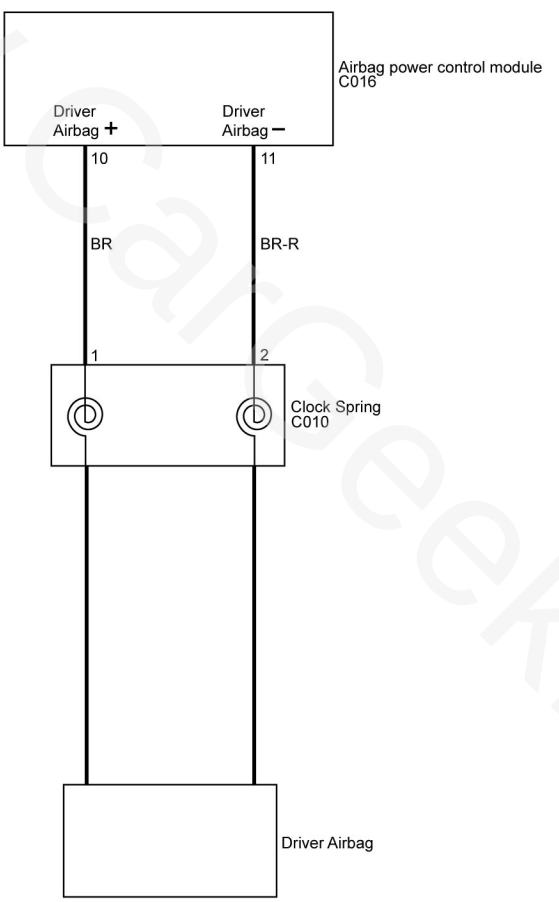
No> replace harness

B1346 HIGH RESISTANCE, DRIVER’S AIR BAG IGNITER
B 1347LOW RESISTANCE, DRIVER’S AIR BAG IGNITER

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1346 B1347	• Short circuit of SRS harness • Open circuit of SRS harness • SRS defects, driver • Defects, clock spring • SRS Control Module defects	• SRS circuit, driver • Driver’s SRS Assembly • Clock Spring • SRS Control Module

Circuit diagram



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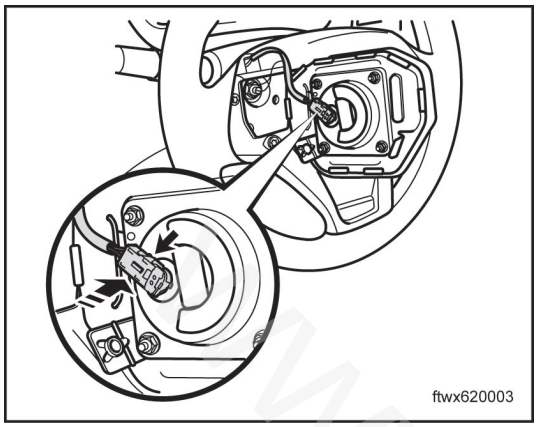
Diagnostic steps

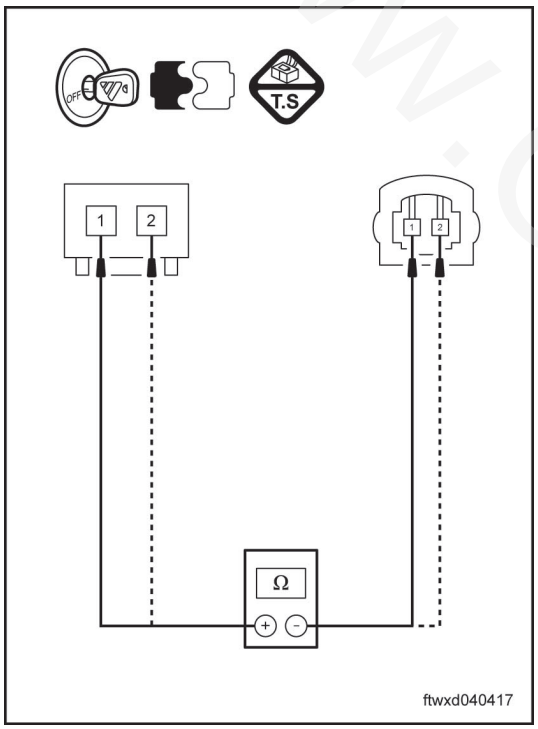
1 . Check clock spring

(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Dismantle horn button assembly and disconnect the driver's SRS assembly connector.

(c) Disconnect the connector of clock spring C010.



(d) Check the resistance between clock spring socket C010 and driver’ s SRS assembly connector.

Standard voltage

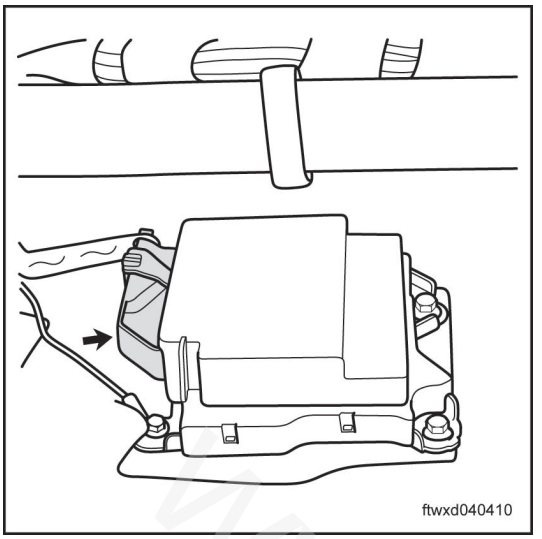
Multimeter connection	Standard value
C010 (1) Driver’ s SRS assembly connector (1)	＜2 Ω
C010 (2) Driver’ s SRS assembly connector (2)	

Check whether the result is normal?

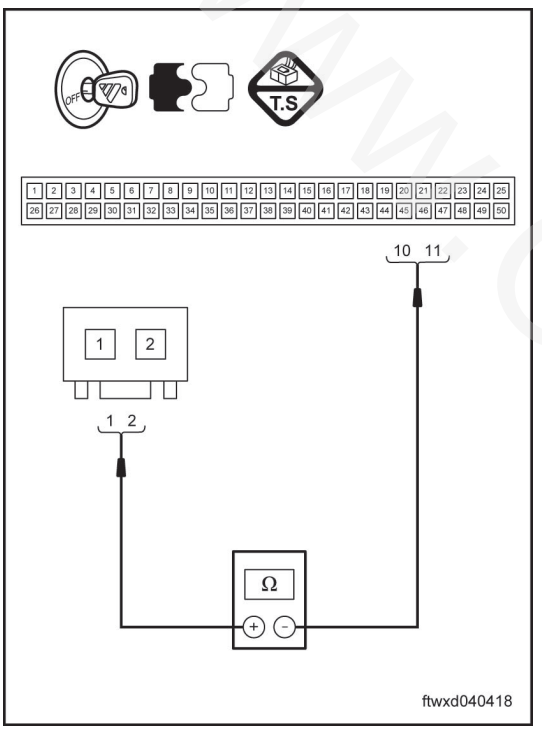
Yes> go to step 2

No> Replace the clock spring

2 . Check the harness (SRS control module-clock spring)



(a) Disconnect SRS control module connector C016.



(b) Measure the resistance between SRS control module connector C016 and clock spring Connector C010.

Standard voltage

Multimeter connection	Standard value
C016(10) - C010(1)	< 2 Ω
C016(11) - C010(2)	

Check whether the result is normal?

Yes> Replace Driver’ s SRS assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

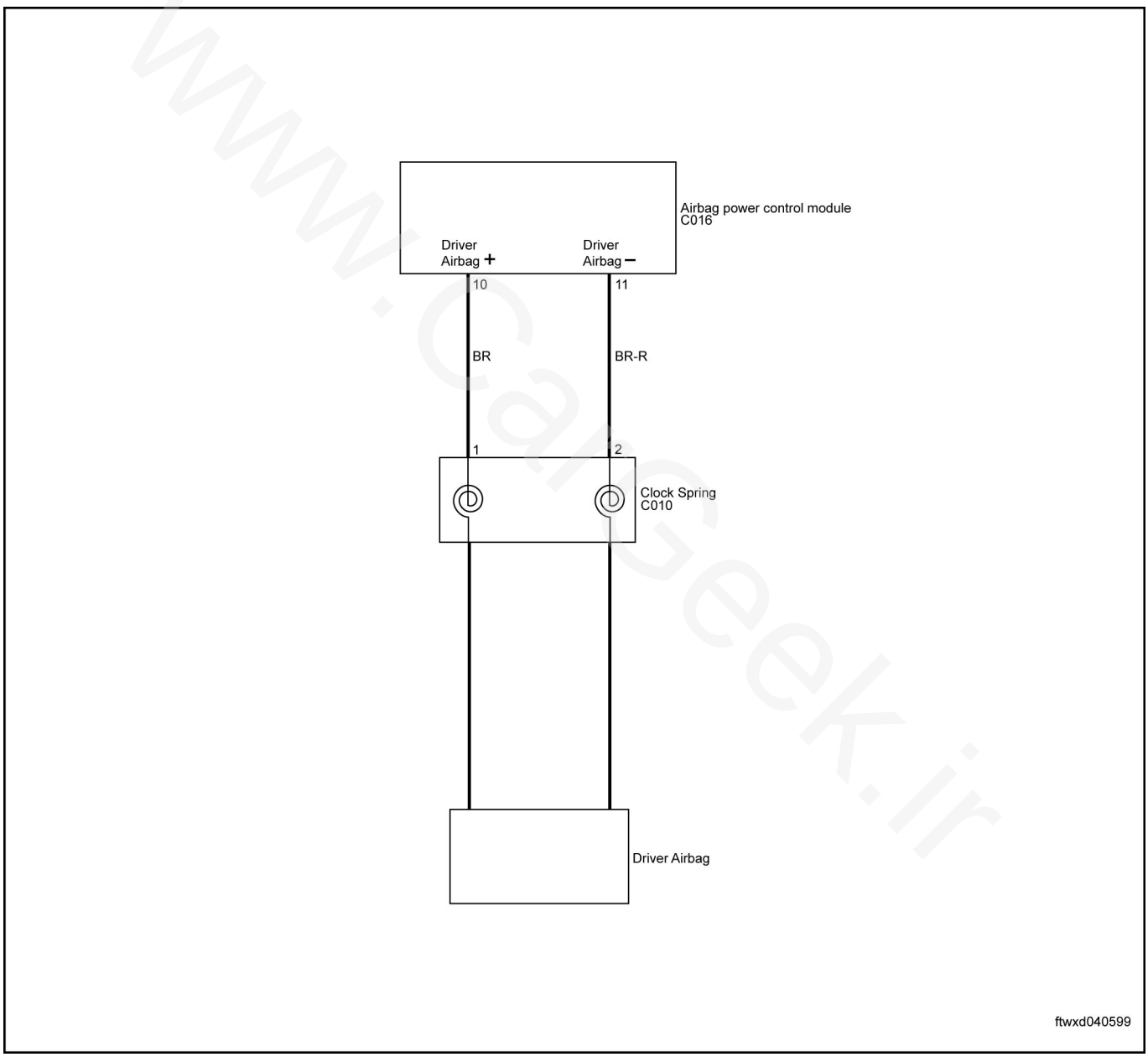
No > Maintenance or replace harness.

B1348 GROUND, DRIVER’S AIR BAG IGNITION

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1348	• Ground short circuit of SRS harness • SRS defects, driver • Defects, clock spring • SRS Control Module defects	• SRS circuit, driver • Driver’s SRS Assembly • Clock Spring • SRS Control Module

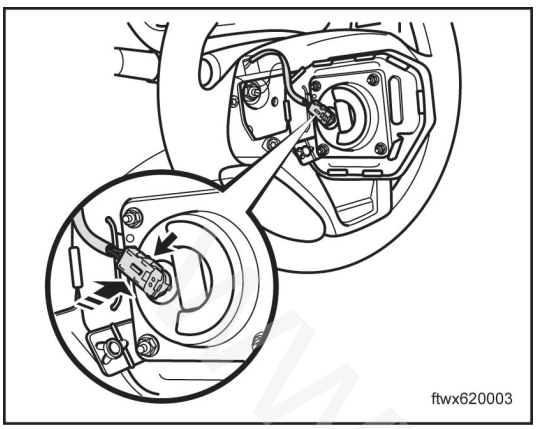
Circuit diagram



Diagnostic steps

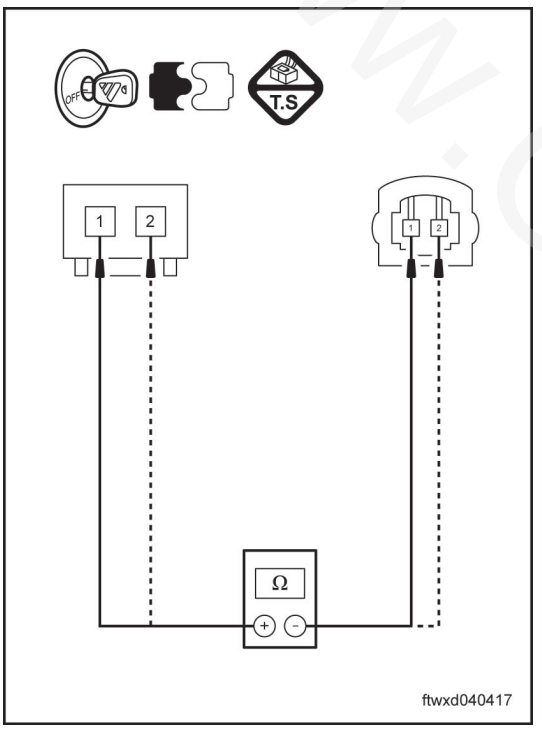
1 . Check clock spring

(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Dismantle horn button assembly and disconnect the driver's SRS assembly connector.

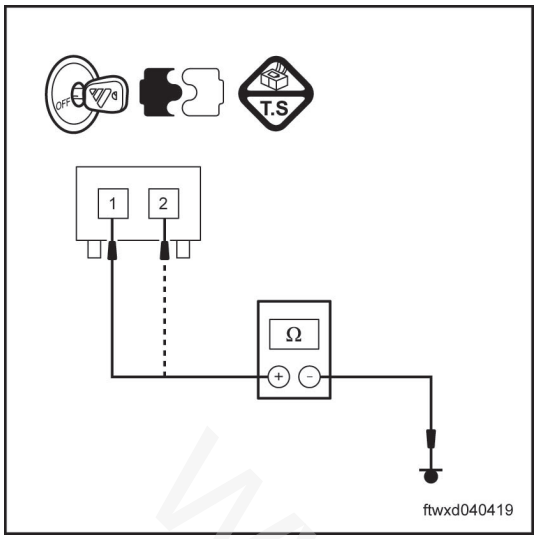
(c) Disconnect the connector of clock spring C010.



(d) Check the resistance between clock spring socket C010 and driver’s SRS assembly connector.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C010 (1) Driver’s SRS assembly connector (1)	＜2 Ω
C010 (2) Driver’s SRS assembly connector (2)	



(e) Check the resistance between clock spring socket C010 and driver’s SRS assembly connector.

Standard resistance (check whether there is short circuit)

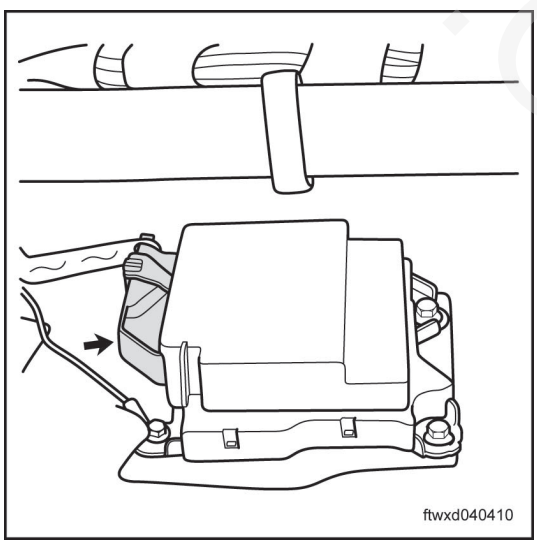
Multimeter connection	Standard value
C010 (1) ground	⩾ 1 MΩ
C010 (2) ground	

Check whether the result is normal?

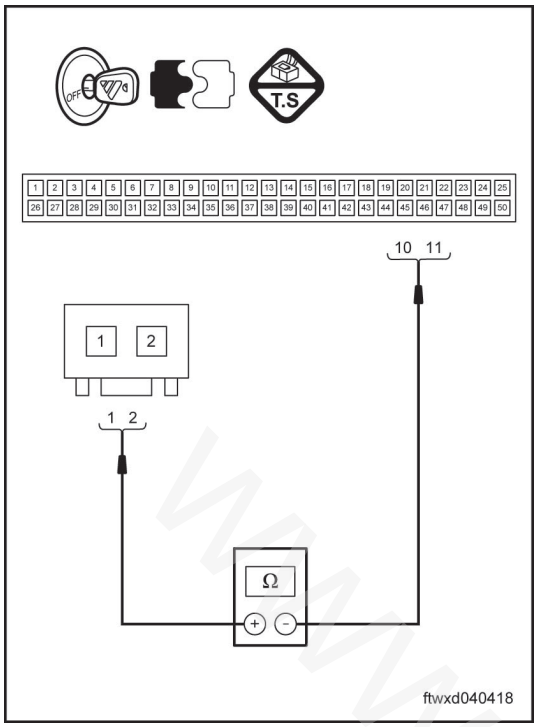
Yes> go to step 2

No> Replace the clock spring

2 . Check the harness (SRS control module-clock spring)



(a) Disconnect SRS control module connector C016.



(b) Measure the resistance between SRS control module connector C016 and clock spring Connector C010.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
C016(10) - C010(1)	＜ 2 Ω
C016(11) - C010(2)	

Check whether the result is normal?

Yes> Replace Driver’ s SRS assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

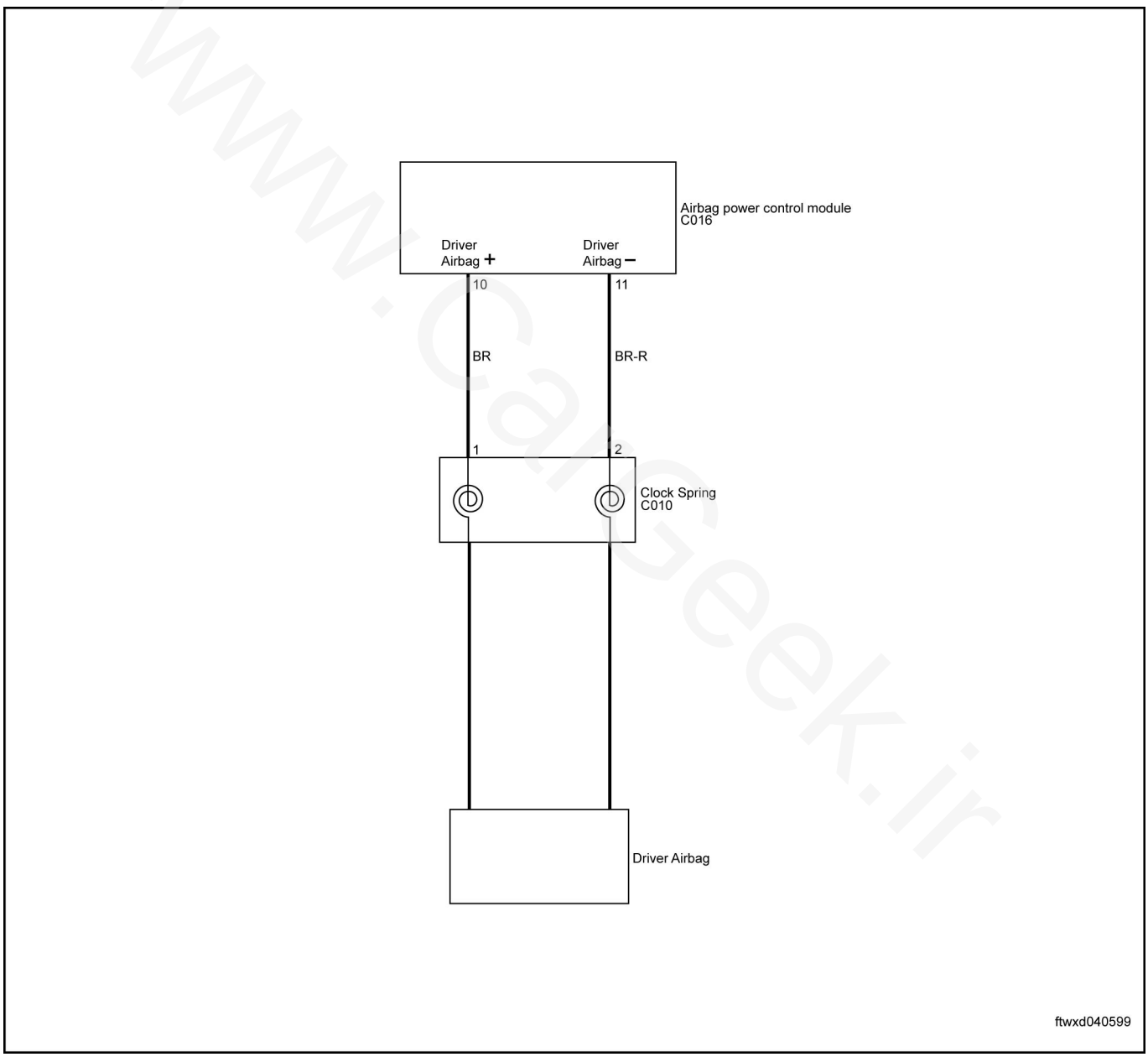
No> replace harness

B1349 CONNECTION BATTERY, DRIVER’S AIR BAG IGNITER

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1349	• Battery short circuit of SRS harness • SRS defects, driver • Defects, clock spring • SRS Control Module defects	• SRS circuit, driver • Driver’s SRS Assembly • Clock Spring • SRS Control Module

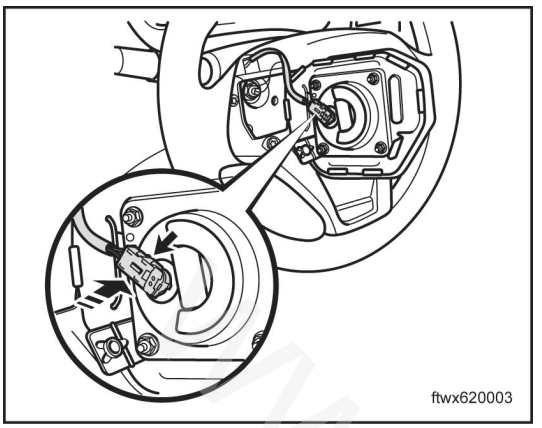
Circuit diagram



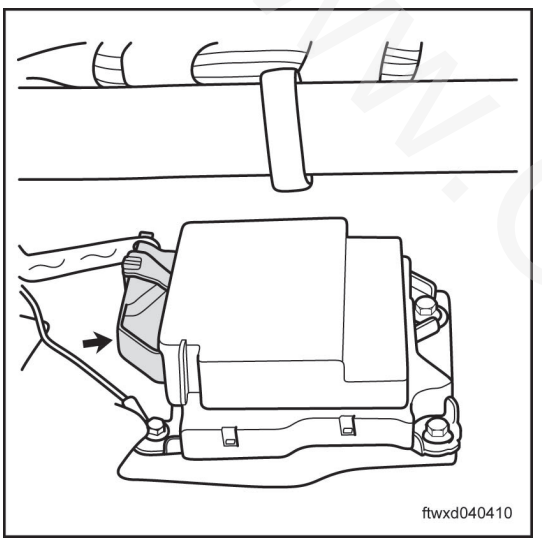
Diagnostic steps

1 . Check harness (SRS control module-lock spring)

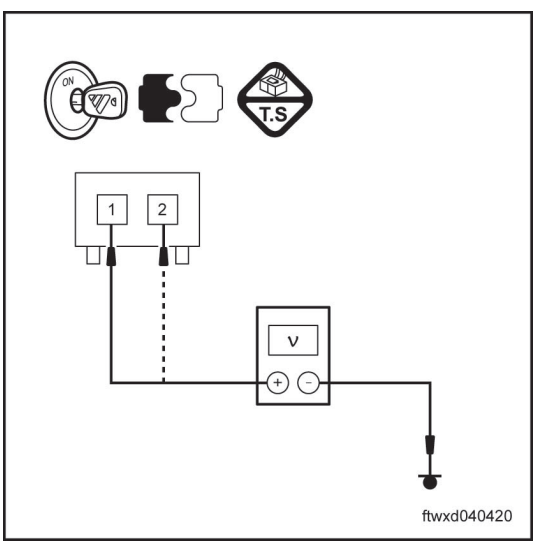
(a) Turn off the ignition switch, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Dismantle horn button assembly and disconnect the driver's SRS assembly connector.



(c) Disconnect SRS control module connector C016.
(d) Disconnect the connector of clock spring C010.
(e) Connect the negative pole of the battery and turn on ignition switch to “ON”.



(f) Disconnect the connector of clock spring C010.

Standard voltage

Multimeter connection	Standard value
C010 (1) ground	0V
C010 (2) ground	

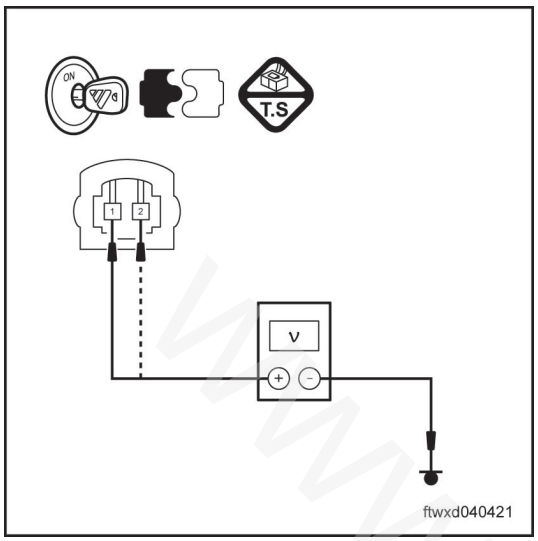
Check whether the result is normal?

Yes> go to step 2

No> replace harness

2 . Check clock spring

(a) Turn off ignition switch and connect Clock spring connector C010.



(b) Turn on ignition switch to “ON”, and check driver’s SRS connector.

Standard voltage

Multimeter connection	Standard value
Driver’s SRS connector (1) ground	0V
Driver’s SRS connector (2) ground	

Check whether the result is normal?

Yes> Replace SRS Control Module

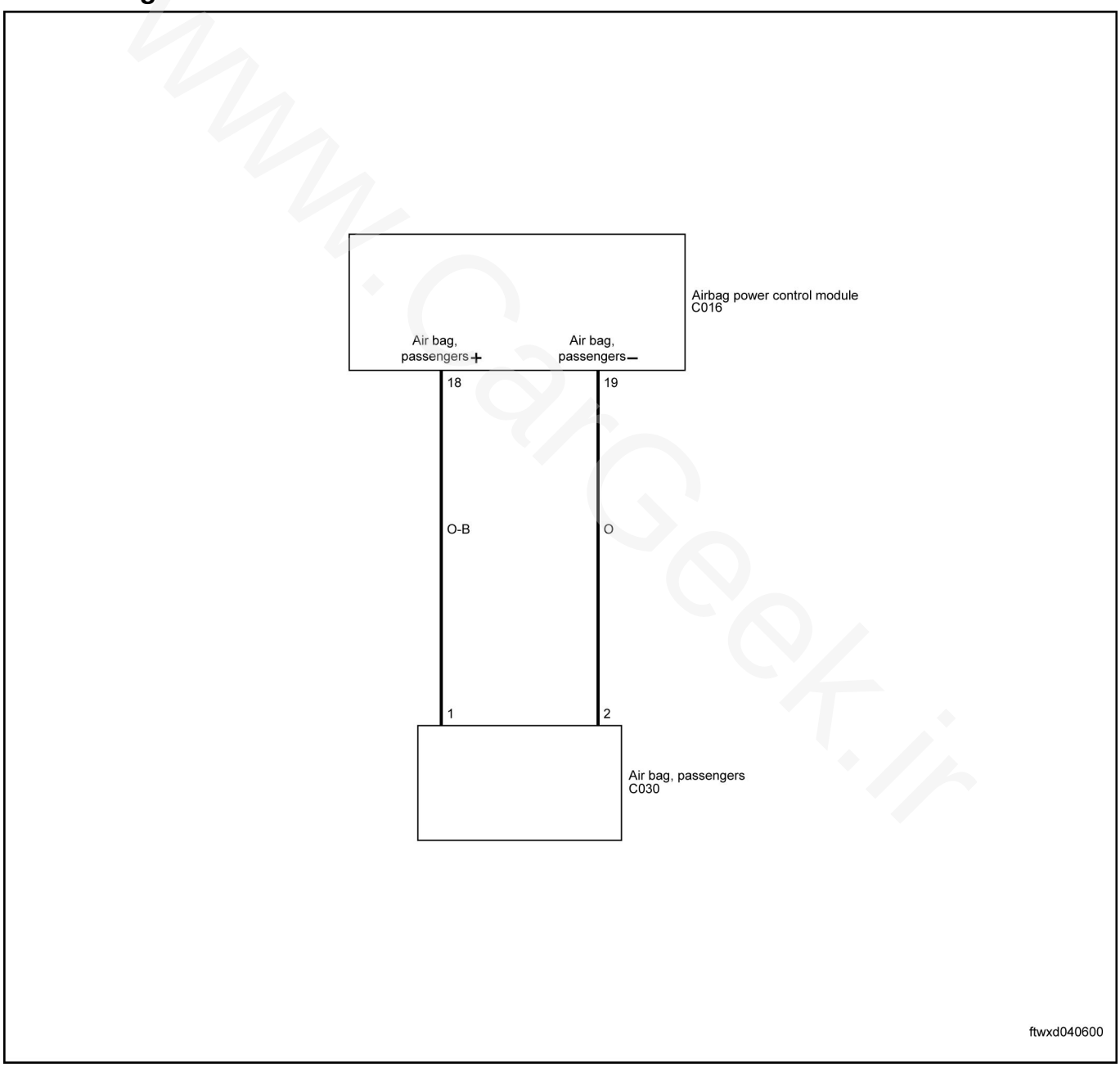
No> Replace the clock spring

B1352HIGH RESISTANCE , PASSENGERS' AIR BAG IGNITER
B1352 LOW RESISTANCE, PASSENGERS' AIR BAG IGNITER

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1352 B1353	• Short circuit of SRS harness • Open circuit of SRS harness • Passenger SRS defect • SRS Control Module defects	• Passenger SRS circuit • Passenger SRS assembly • SRS Control Module

Circuit diagram



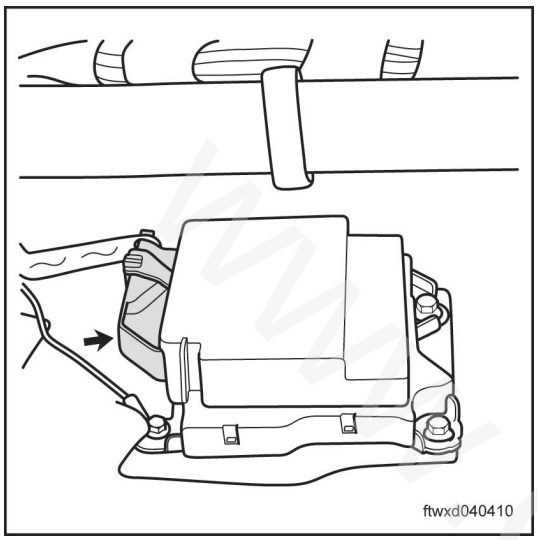
Diagnostic steps

1 . Check the harness (Passengers' air bag assembly-SRS control module)

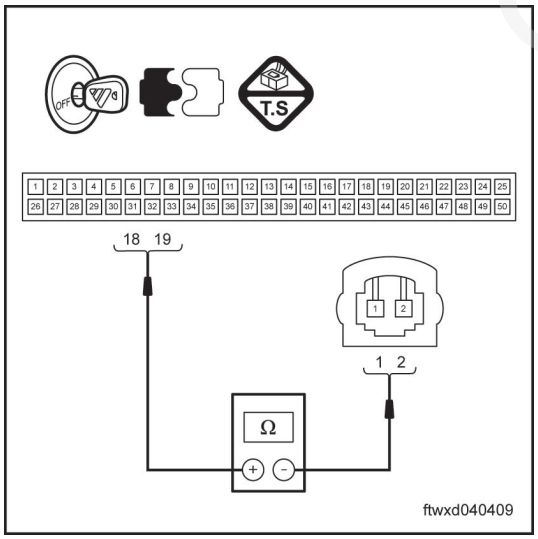
(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.

(b) Dismantle horn button assembly and disconnect the driver's SRS assembly connector.

(c) Disconnect Passengers' air bag assembly connector C030.



(d) Disconnect SRS control module connector C016.



(e) Measure the resistance between SRS control module connector C016 and Passengers' air bag connector C030.

Standard voltage

Multimeter connection	Standard value
C016(18) - C010(1)	< 2 Ω
C016(19) - C010(2)	

Check whether the result is normal?

Yes> Replace passengers' SRS assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

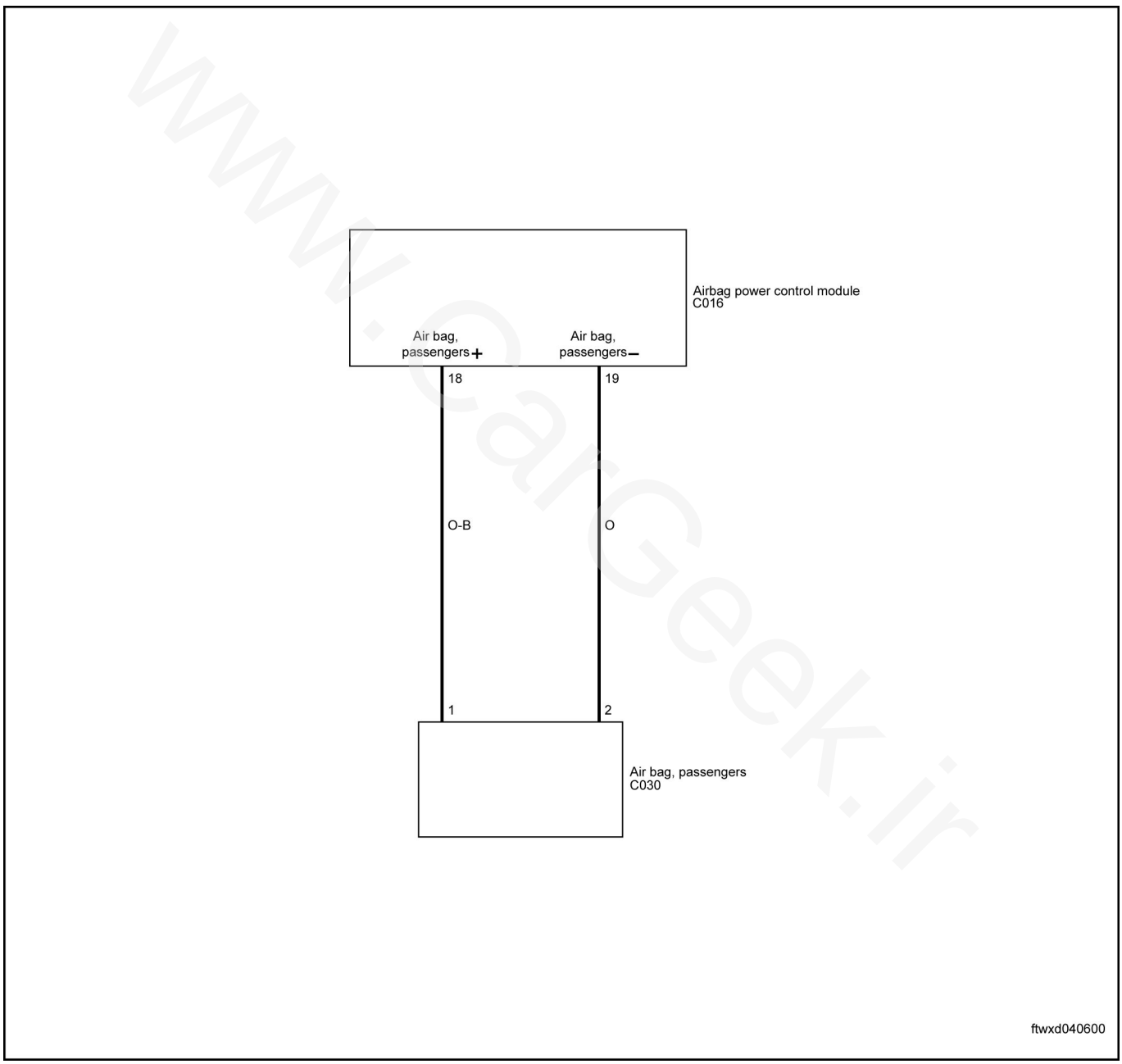
No > Maintenance or replace harness.

B1354 GROUND, PASSENGERS' AIR BAG IGNITER

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1354	• Ground short circuit of SRS harness • Passenger SRS defect • SRS Control Module defects	• Passenger SRS circuit • Passenger SRS assembly • SRS Control Module

Circuit diagram

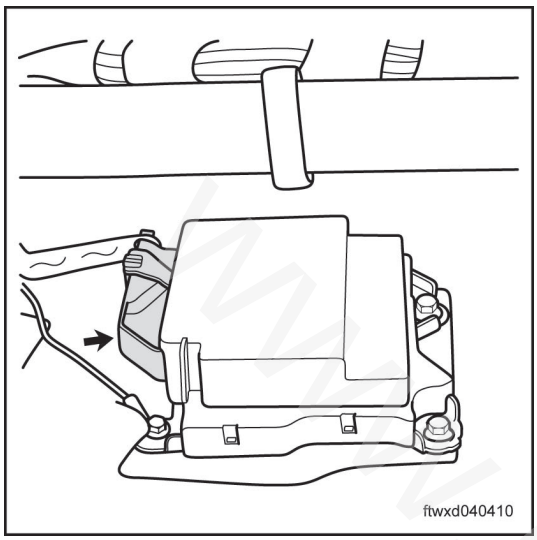


Diagnostic steps

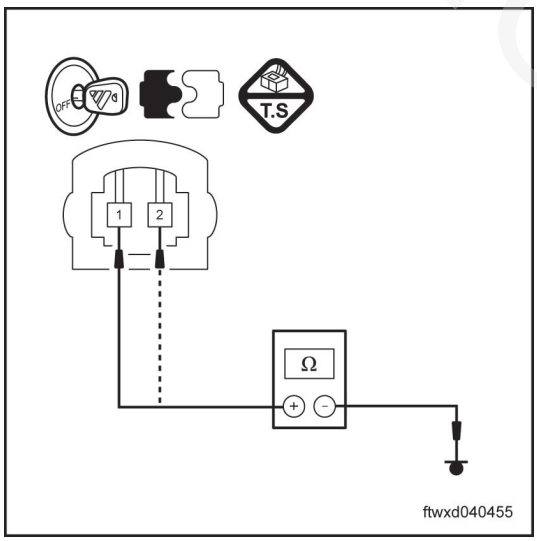
1 . Check passengers' air bag assembly (passengers' air bag assembly-ground)

(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.

(b) Disconnect Passengers' air bag assembly connector C030.



(c) Disconnect SRS control module connector C016.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C030 (1)— ground	⩾ 1 MΩ
C030 (2)— ground	

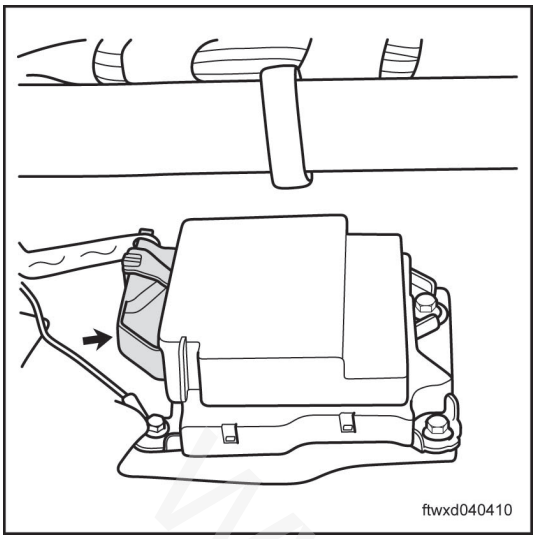
Check whether the result is normal?

Yes> go to step 2

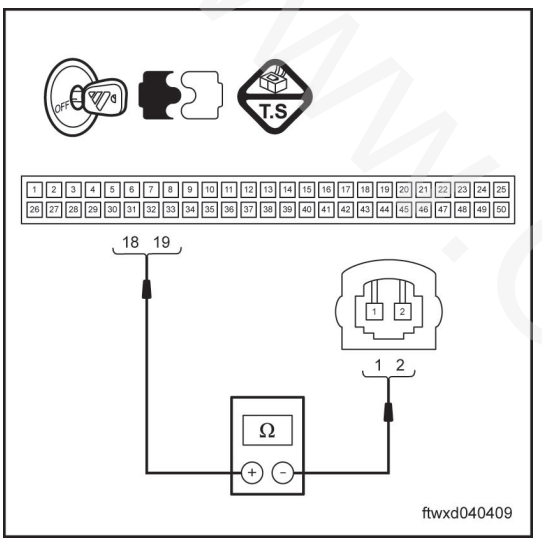
No> Replace passengers' air bag assembly.

2 . Check the harness (Passengers' air bag assembly-SRS control module)

(a) Disconnect Passengers' air bag assembly connector C030.



(b) Disconnect SRS control module connector C016.



(c) Measure the resistance between SRS control module connector C016 and Passengers' air bag connector C030.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016(18) - C030(1)	＜2 Ω
C016(19) - C030(2)	

Check whether the result is normal?

Yes> Replace passengers' air bag assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

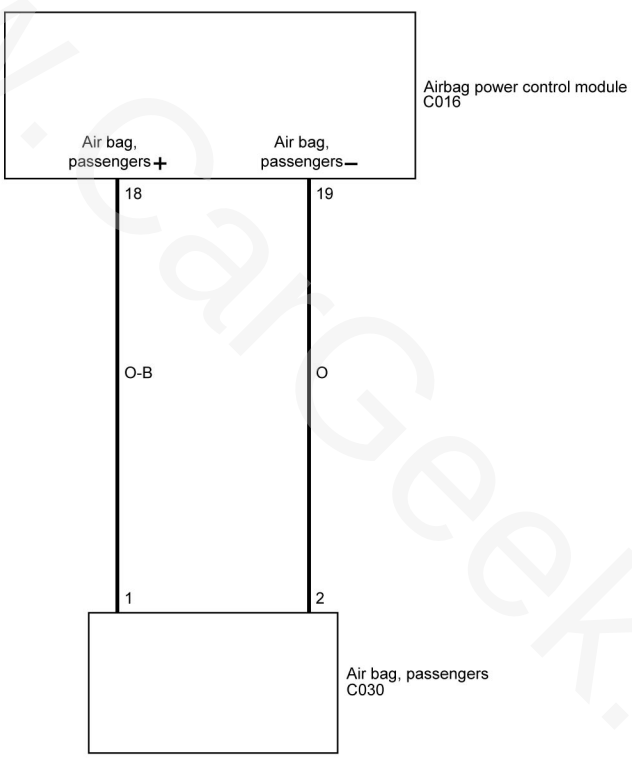
No> replace harness

B 1355-PASSENGERS' AIR BAG IGNITER CONNECTION BATTERY

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1355	• Battery short circuit of SRS harness • Passenger SRS defect • SRS Control Module defects	• Passenger SRS circuit • Passenger SRS assembly • SRS Control Module

Circuit diagram



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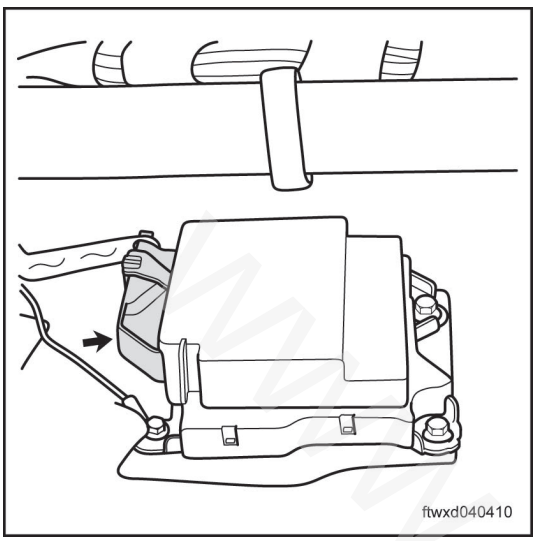
Diagnostic steps

1 . Check passengers' SRS (SRS control module-passengers' SRS)

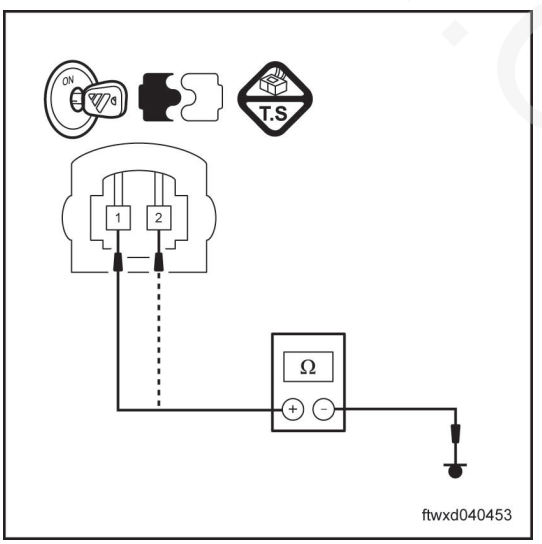
(a) Turn off the ignition switch, and disconnect the negative pole of the battery for more than 90 seconds.

(b) Disconnect Passengers' air bag assembly connector C030.



(c) Disconnect SRS control module connector C016.

(d) Connect the negative pole of the battery and turn on ignition switch to "ON".



(e) Check passengers' air bag assembly connector C030.

Standard voltage

Multimeter connection	Standard value
C016 (1) ground	0V
C016 (1) ground	

Check whether the result is normal?

Yes> Replace SRS Control Module

No> Replace passengers' air bag assembly.

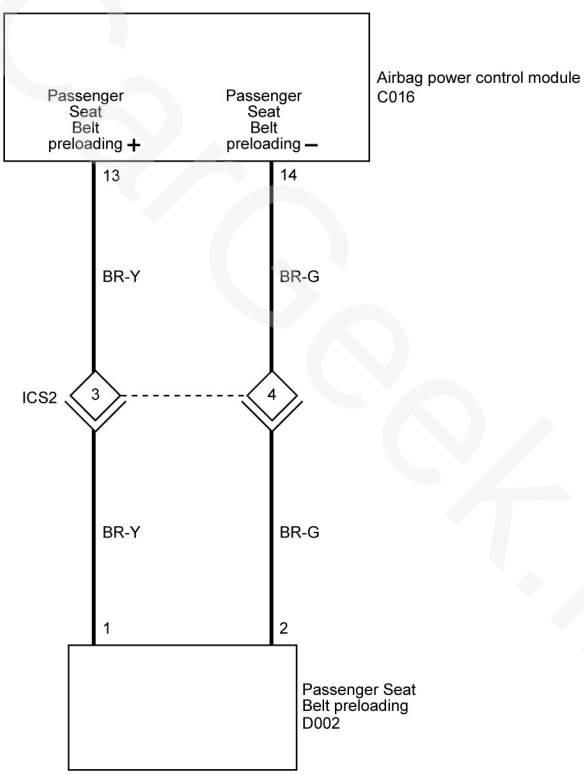
B1361-HIGH RESISTANCE OF THE PRELOADING IGNITER, DRIVER’S SEAT BELT

B1362-LOW RESISTANCE OF PRELOADING IGNITER, DRIVER’S SEAT BELT

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1361 B1362	• Short circuit of seat belt, preloading harness • Open circuit of seat belt , preloading harness • Preloading defects, driver’s seat belt • Preloading control module defects, seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • Preloading control module defects, seat belt

Circuit diagram

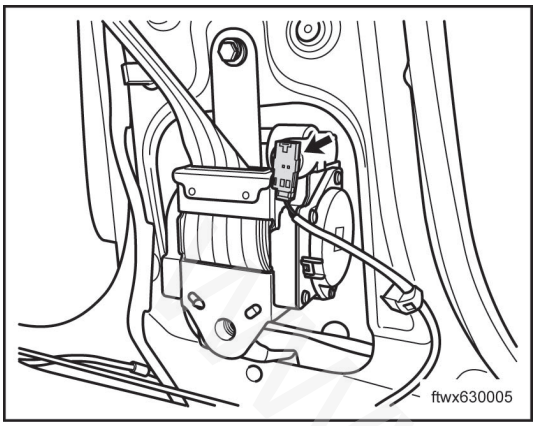


ftwxd040601

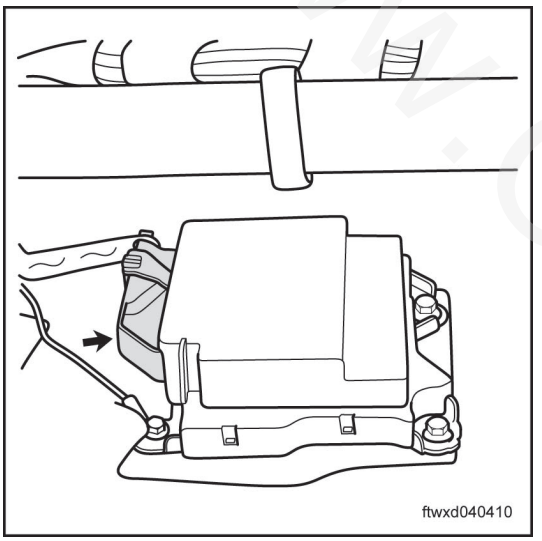
Diagnostic steps

1 . Check the harness (Preloading assembly, driver’s seat belt—SRS control module)

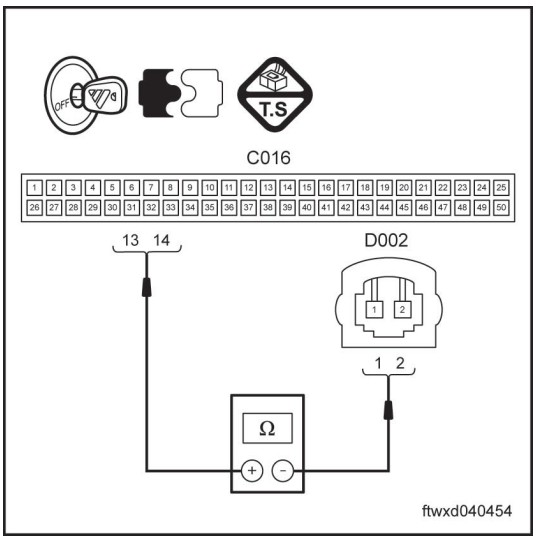
(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Disconnect preloading assembly connector D002, driver’s seat belt.



(c) Disconnect SRS control module connector C016.



(d) Measure the resistance between SRS control module connector C016 and Passengers’ air bag connector D002.

Standard voltage

Multimeter connection	Standard value
C016(13) - C010(1)	＜2 Ω
C016(14) - C010(2)	

Check whether the result is normal?

Yes> Replace Driver’ s seat belt preloading assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

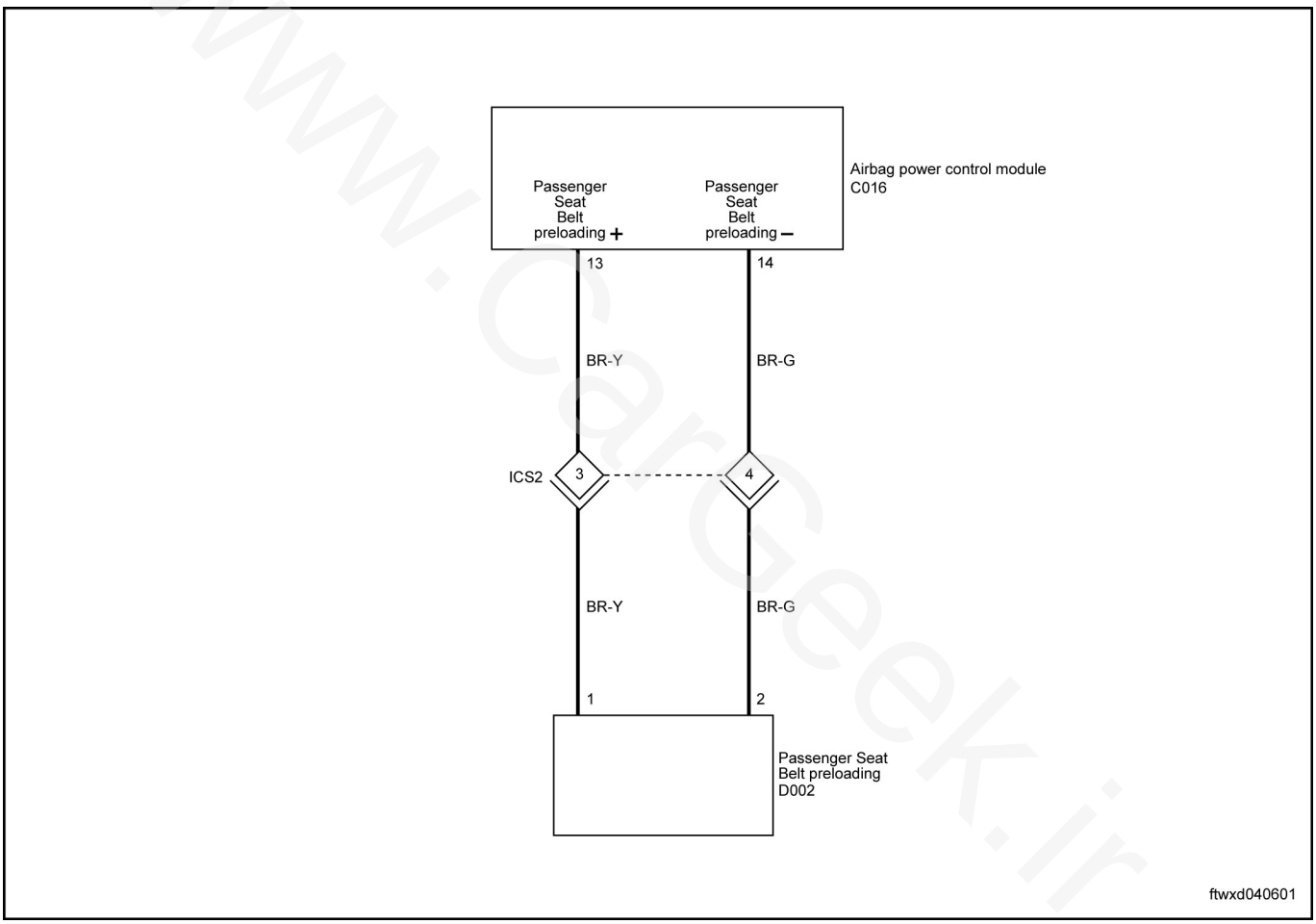
No > Maintenance or replace harness.

GROUND OF THE PRELOADING IGNITER, DRIVER’S SEAT BELT

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1363	• The preloading harness is short circuit to the ground, driver’s seat belt • Preloading defects, driver’s seat belt • Preloading control module defects, driver’s seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • Preloading control module, driver’s seat belt

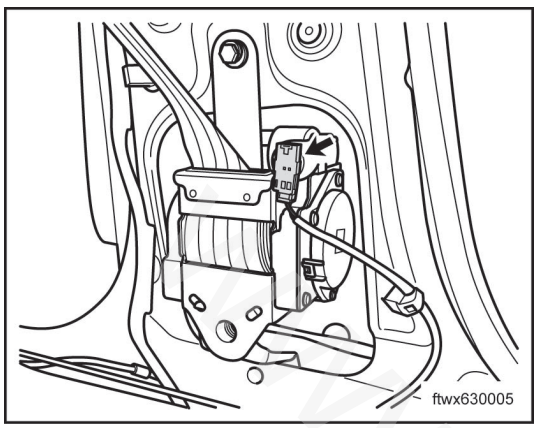
Circuit diagram



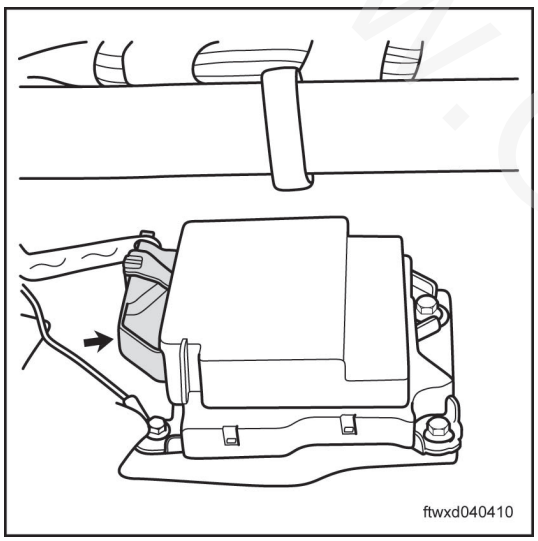
Diagnostic steps

1 . Check the preloading assembly (preloading assembly －ground, driver’ s seat belt), driver's seat belt.

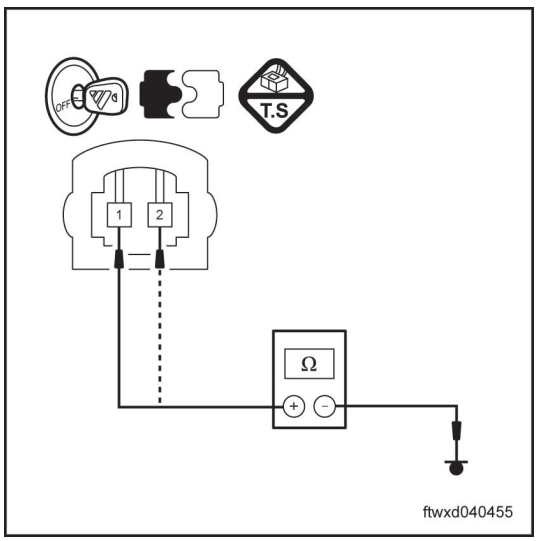
(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Disconnect preloading assembly connector D002, driver’ s seat belt.



(c) Disconnect SRS control module connector C016.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

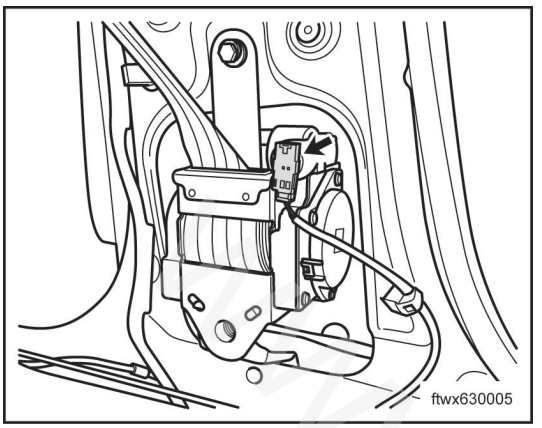
Multimeter connection	Standard value
D002(1) ground	⩾ 1 MΩ
D002(2) ground	

Check whether the result is normal?

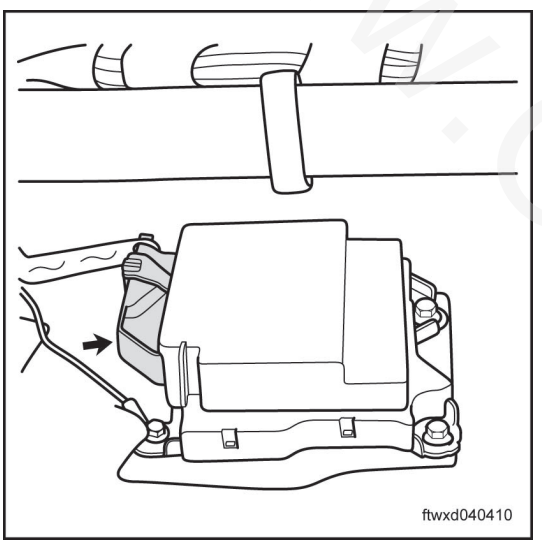
Yes> go to step 2

No ? Replace preloading assembly, driver’s seat

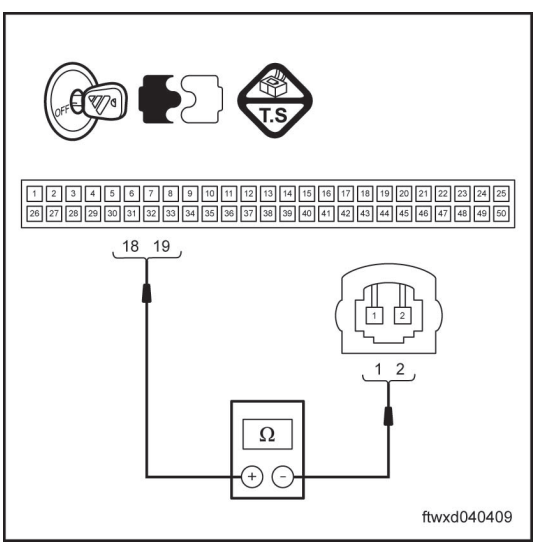
2 . Check the harness (Preloading assembly, driver’s seat belt—SRS control module)



(a) Disconnect preloading assembly connector D002, driver’s seat belt.



(b) Disconnect SRS control module connector C016.



(c) Measure the resistance between SRS control module connector C016 and driver’s seat belt preloading assembly connector D002.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016(13) - C010(1)	＜ 2 Ω
C016(14) - C010(2)	

Check whether the result is normal?

Yes > Replace preloading assembly- driver’s seat belt, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

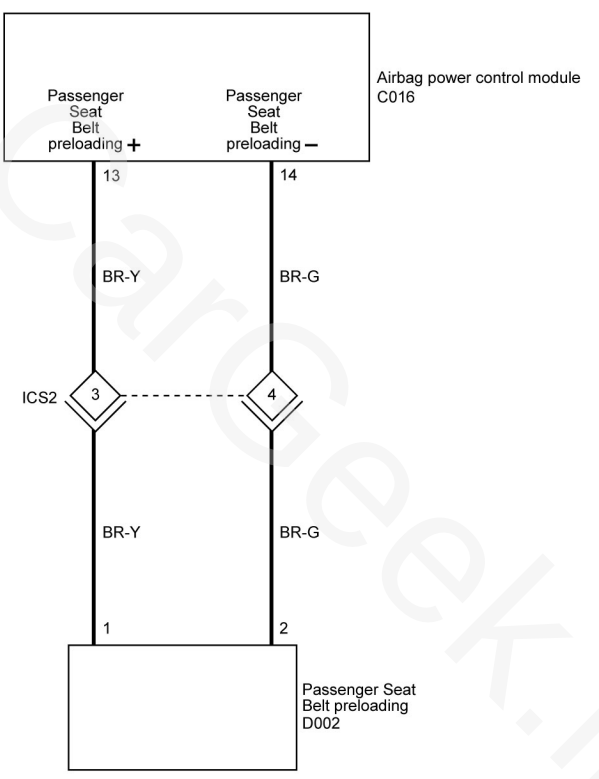
No> replace harness

B1364-PRELOADING IGNITER CONNECTION BATTERY, DRIVER’S SEAT BELT

Diagnostic code

DTC code	DTC inspection conditions	Trouble location
B1364	• The preloading harness is short circuit to the ground, driver’s seat belt • Preloading defects, driver’s seat belt • Preloading control module defects, driver’s seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • Preloading control module, driver’s seat belt

Circuit diagram

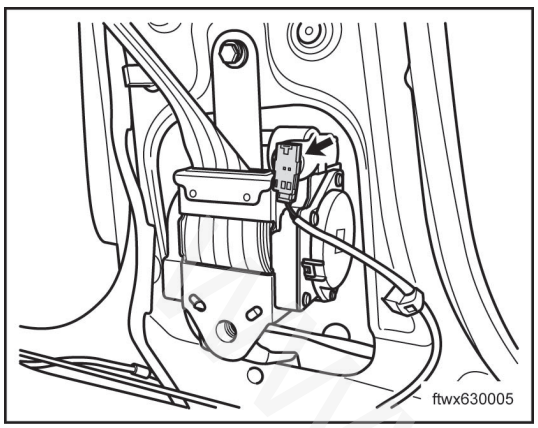


ftwxd040601

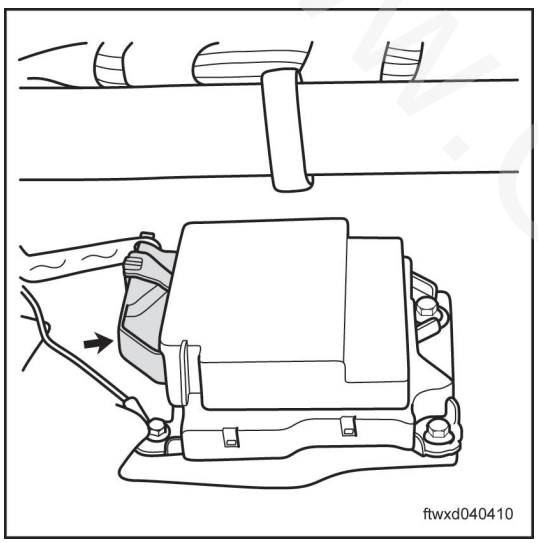
Diagnostic steps

1 . Check preloading assembly, driver’s seat belt (SRS control module-preloading assembly, driver’s seat belt)

(a) Turn off the ignition switch, and disconnect the negative pole of the battery for more than 90 seconds.

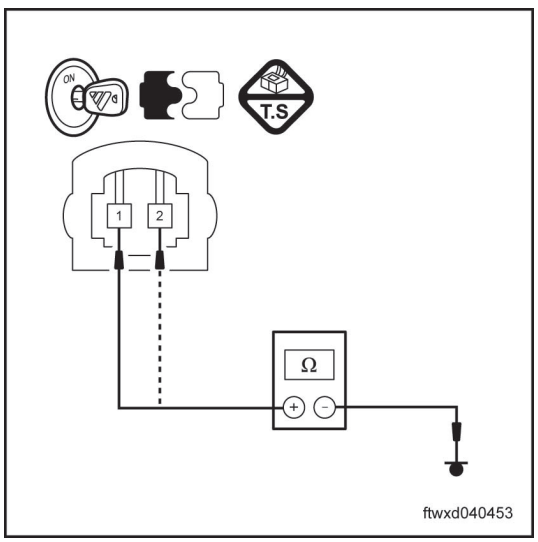


(b) Disconnect preloading assembly connector D002, driver’s seat belt.



(c) Disconnect SRS control module connector C016.

(d) Connect the negative pole of the battery and turn on ignition switch to “ON”.



(e) Check preloading assembly connector D002, driver’s seat belt.

Standard voltage

Multimeter connection	Standard value
D002(1) ground	0V
D002(2) ground	

Check whether the result is normal?

Yes> Replace SRS Control Module

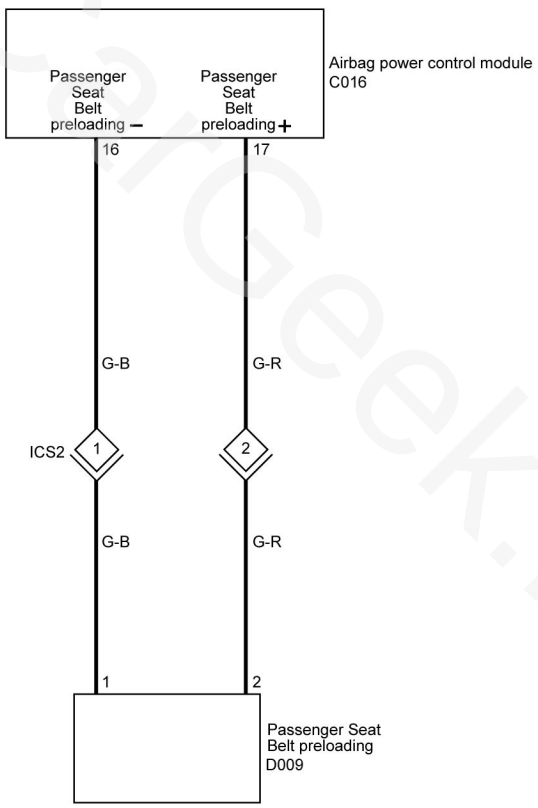
No> Preloading assembly, driver’ s seat belt

B 1367-HIGH RESISTANCE OF THE PRELOADING IGNITER, PASSENGER’S SEAT BELT
B 1368-LOW RESISTANCE OF THE PRELOADING IGNITER, PASSENGERS’ SEAT BELT

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1367 B1368	• Short circuit of seat belt, preloading harness • Open circuit of seat belt , preloading harness • Preloading defects, driver’s seat belt • Preloading control module defects, seat belt	• Preloading circuit, driver’s seat belt • Preloading circuit, driver’s seat belt • Preloading control module defects, seat belt

Circuit diagram

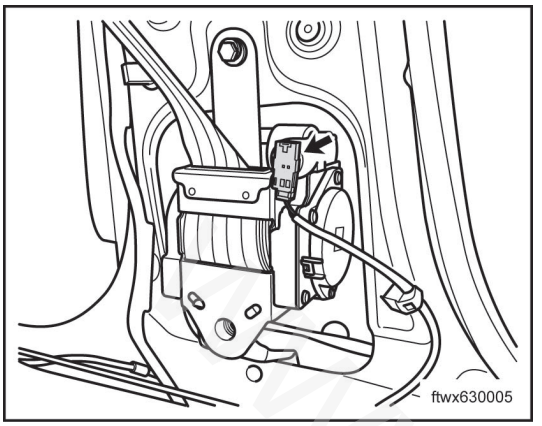


ftwxd040602

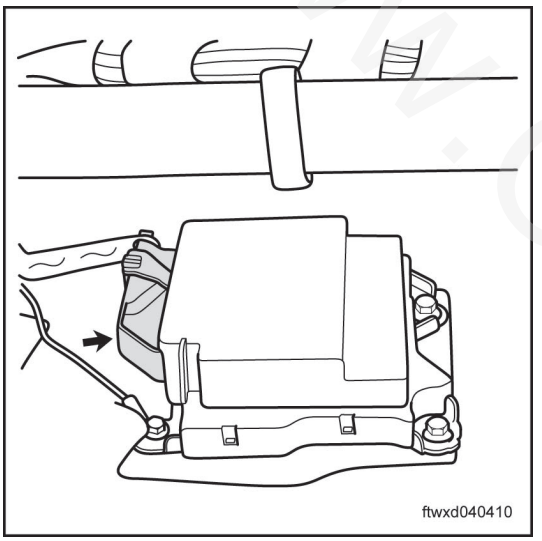
Diagnostic steps

1 . Check the harness (Preloading assembly, passengers' seat belt—SRS control module)

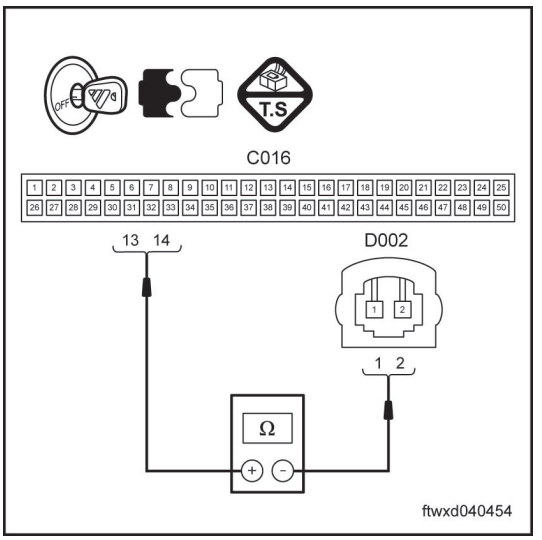
(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Disconnect preloading assembly connector D009, passengers' seat belt.



(c) Disconnect SRS control module connector C016.



(d) Measure the resistance between SRS control module connector C016 and Passengers' air bag connector D009.

Standard voltage

Multimeter connection	Standard value
C016(16) - C009(1)	＜2 Ω
C016(17) - C009(2)	

Check whether the result is normal?

Yes> Replace passenger’ s seat belt preloading assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

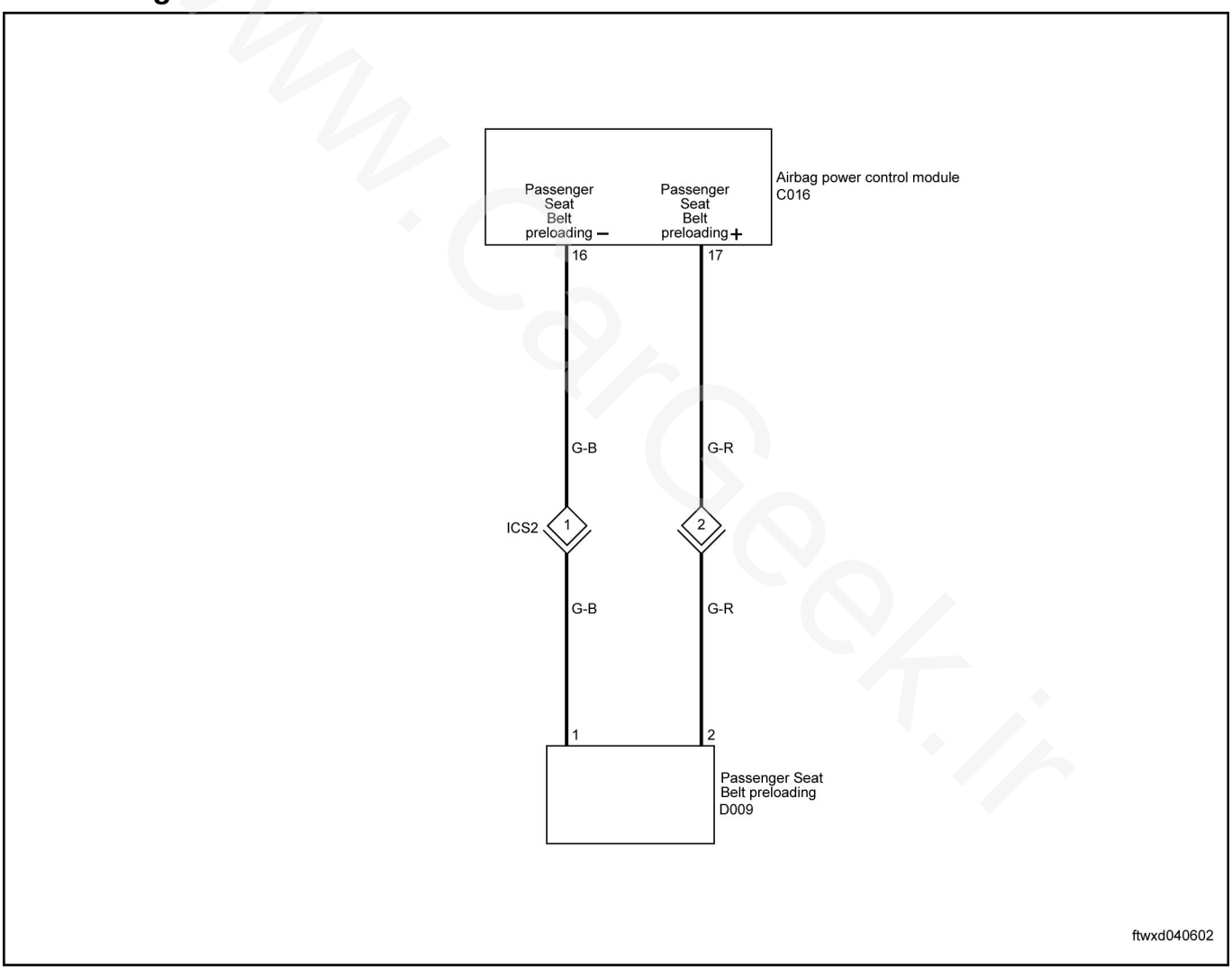
No > Maintenance or replace harness.

B1369 PRELOADING IGNITER GROUND, PASSENGERS' SEAT BELT

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1369	• The preloading harness is short circuit to the ground, passengers' seat belt • Preloading defects, passengers' seat belt • Preloading control module defects, passengers' seat belt	• Preloading circuit, passengers' seat belt • Preloading assembly, passengers' seat belt • Preloading control module , passengers' seat belt

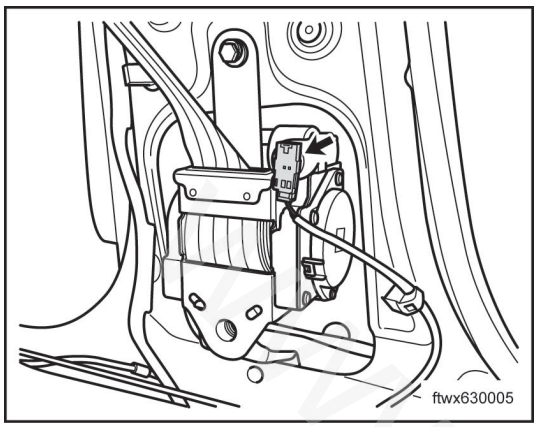
Circuit diagram



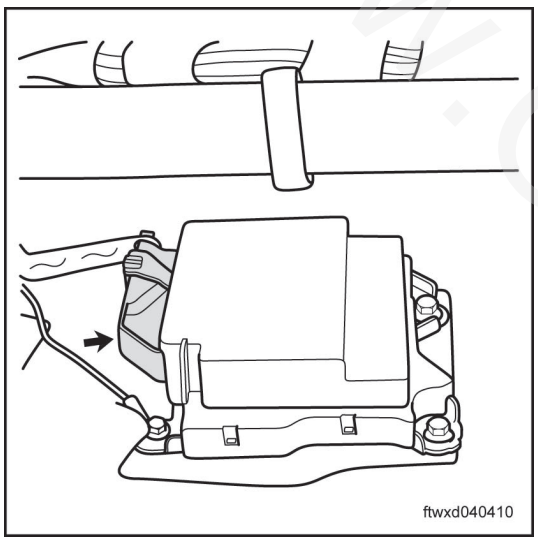
Diagnostic steps

1 . Check the preloading assembly (preloading assembly –ground, passengers' seat belt), passengers' seat belt.

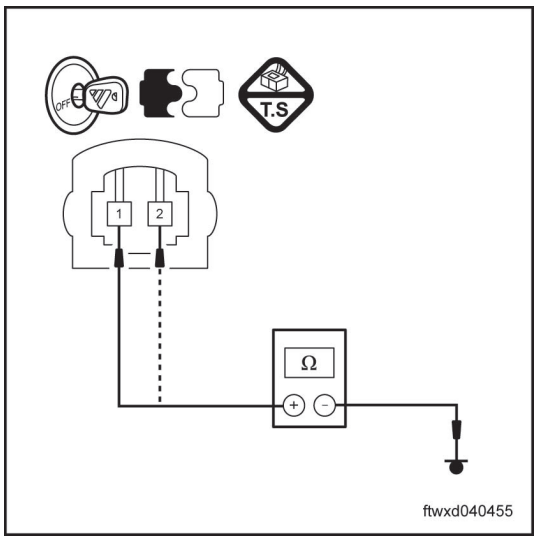
(a) Confirm the ignition switch is closed, and disconnect the negative pole of the battery for more than 90 seconds.



(b) Disconnect preloading assembly connector D009, passengers' seat belt.



(c) Disconnect SRS control module connector C016.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

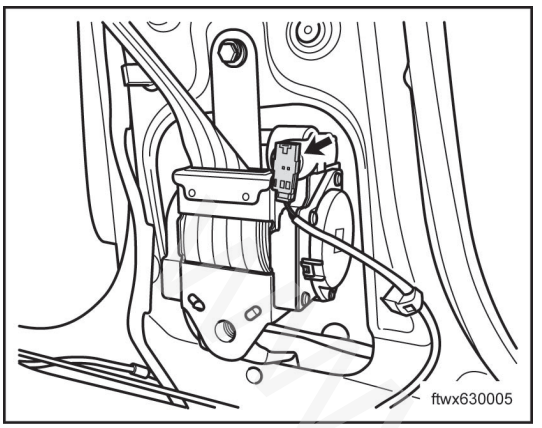
Multimeter connection	Standard value
C009 (1) ground	⩾ 1 MΩ
C009 (2) ground	

Check whether the result is normal?

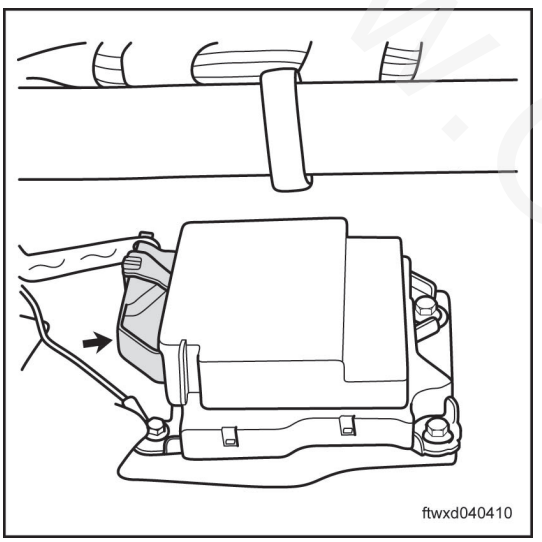
Yes> go to step 2

No> Replace preloading assembly, passengers' seat belt

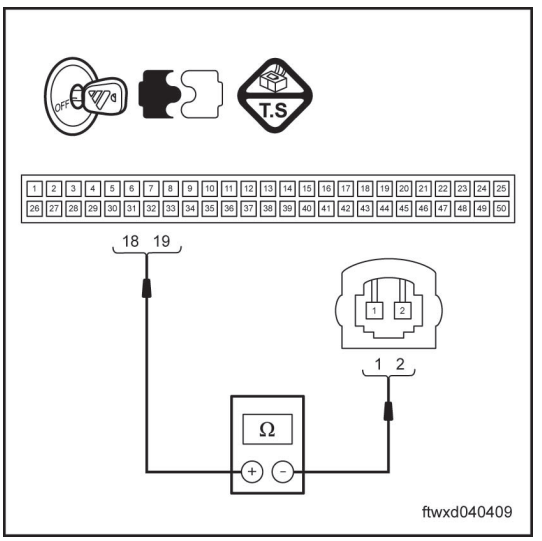
2 . Check the harness (Preloading assembly, passengers' seat belt—SRS control module)



(a) Disconnect preloading assembly connector D009, passengers' seat belt.



(b) Disconnect SRS control module connector C016.



(c) Measure the resistance between SRS control module connector C016 and Passengers' preloading assembly connector D009.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016(16) - C009(1)	＜ 2 Ω
C016(17) - C009(2)	

Check whether the result is normal?

Yes> Replace passenger’ s seat belt preloading assembly, and use diagnostic unit to remove diagnostic defect code; if the defect code is not removed, replace SRS control module.

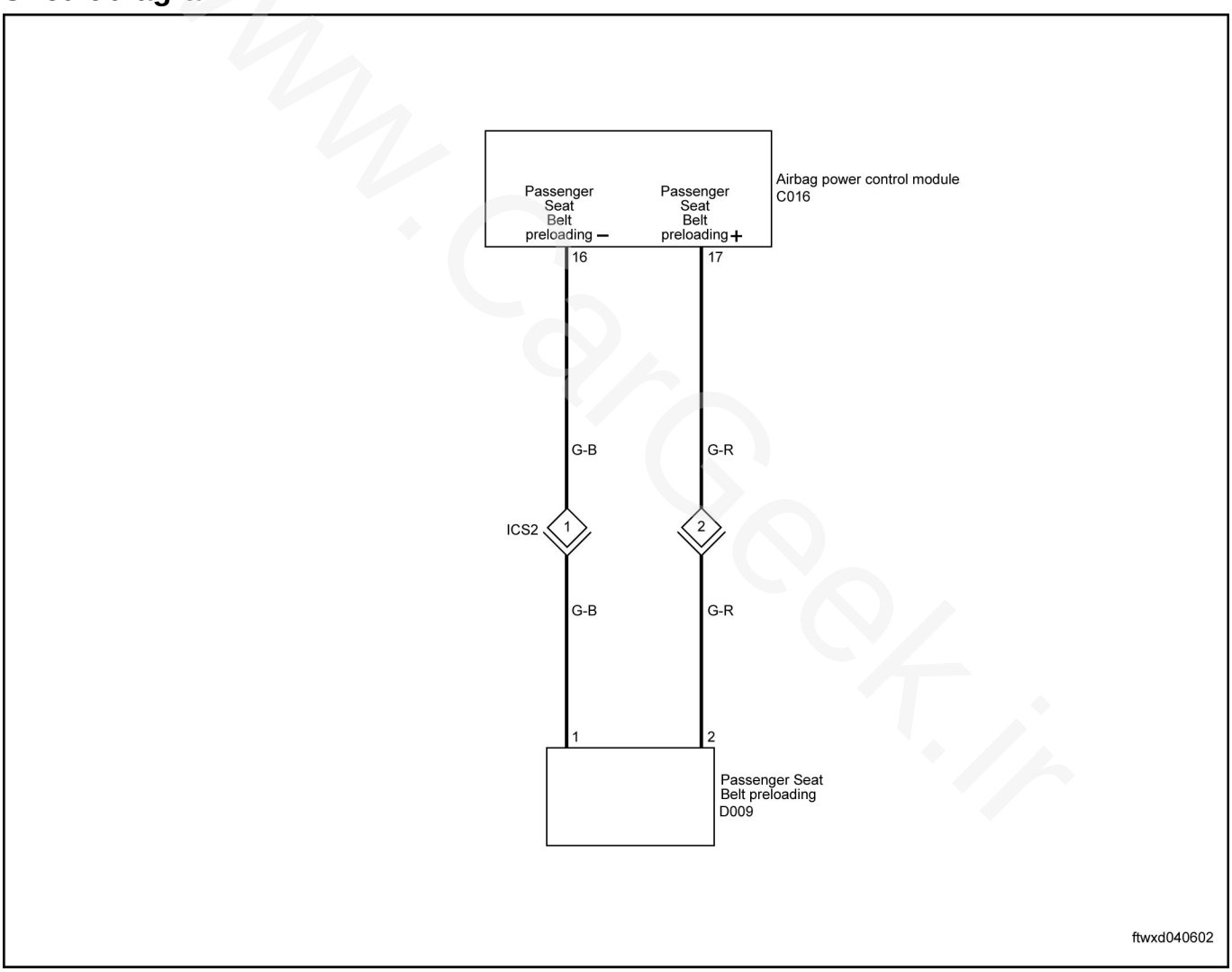
No> replace harness

B1370-PRELOADING IGNITER CONNECTION BATTERY, PASSENGERS' SEAT BELT

Diagnostic Logic

DTC code	DTC inspection conditions	Trouble location
B1370	• The preloading harness is short circuit to the ground, passengers' seat belt • Preloading defects, passengers' seat belt • Preloading control module defects, passengers' seat belt	• Preloading circuit, passengers' seat belt • Preloading assembly, passengers' seat belt • Preloading control module , passengers' seat belt

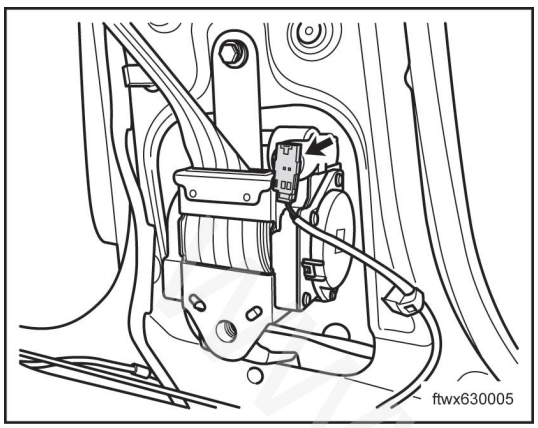
Circuit diagram



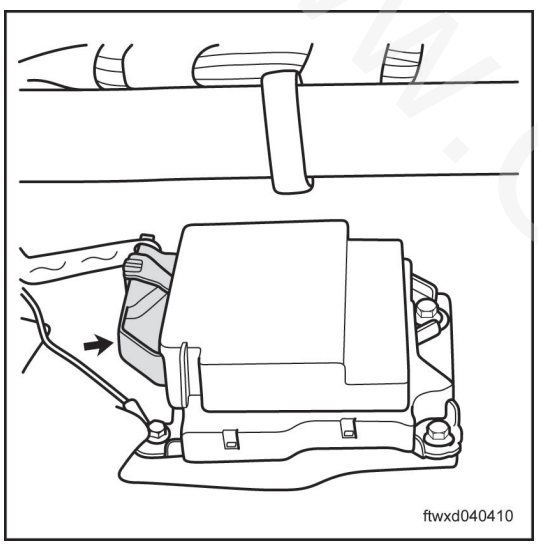
Diagnostic steps

1 . Check preloading assembly, passengers’ seat belt (SRS control module-preloading assembly, passengers’ seat belt)

(a) Turn off the ignition switch, and disconnect the negative pole of the battery for more than 90 seconds.

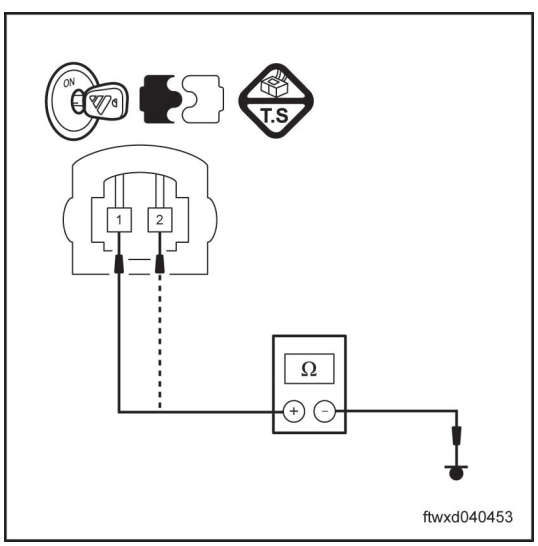


(b) Disconnect preloading assembly connector D009, passengers’ seat belt.



(c) Disconnect SRS control module connector C016.

(d) Connect the negative pole of the battery and turn on ignition switch to “ON”.



(e) Check preloading assembly connector D009, passengers’ seat belt.

Standard voltage

Multimeter connection	Standard value
C009 (1) ground	0V
C009 (2) ground	

Check whether the result is normal?

Yes> Replace SRS Control Module

No> Replace preloading assembly, passengers' seat belt

TRANSFER GEAR

DEFECT PHENOMENON FORM

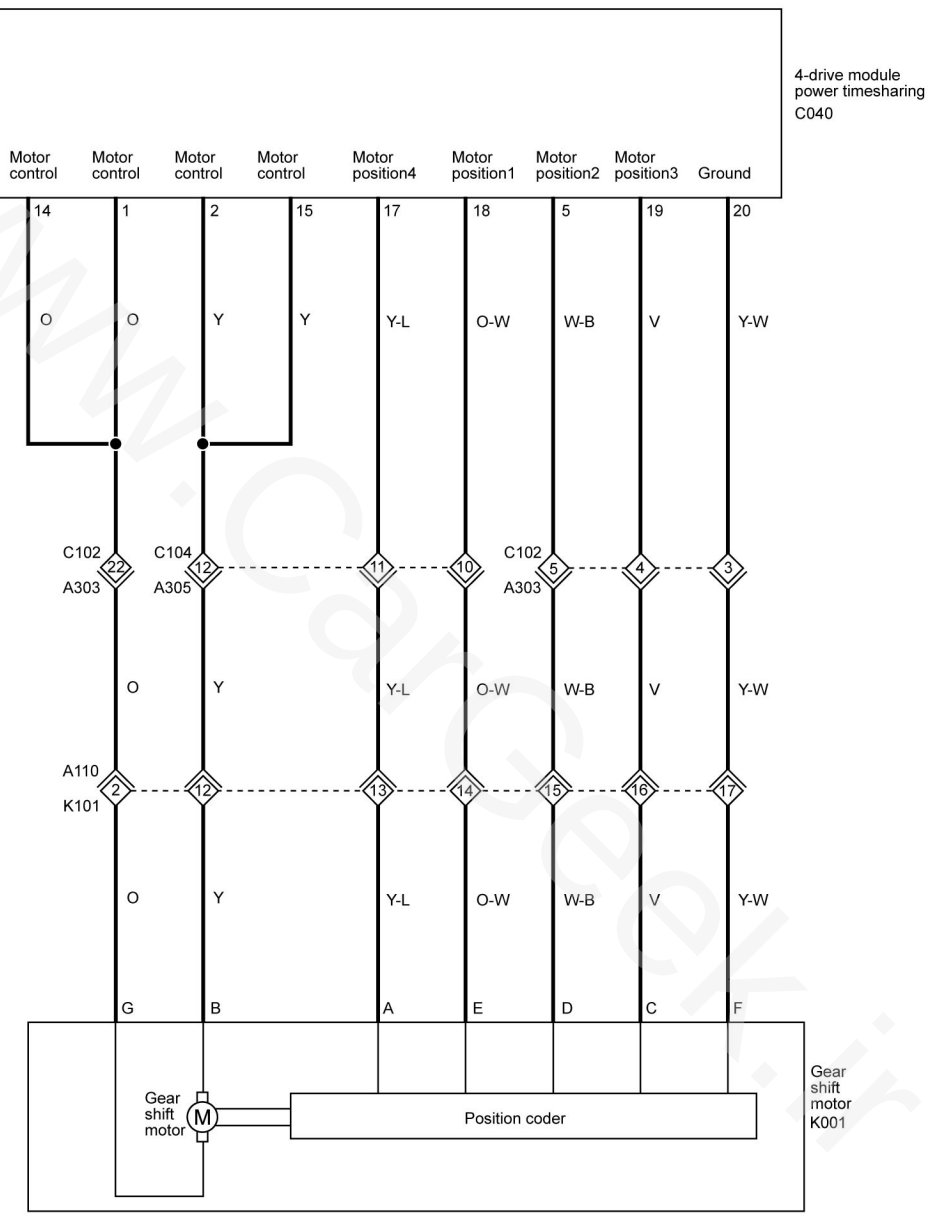
When checking DTC in the checking module, if certain DTC displayed, then the circuit of the code listed in the following list should be checked. The detailed description of each DTC can refer to corresponding pages.

DTC code	Diagnostic items (DTC definition)	Trouble location
U0101	Signal failure, Gears	• Ground harness, gear shift motor • Signal output harness, gear shift motor • Gear shift motor • Raider module, electric timeshar-ing
U0402	Signal failure, Gears	• Ground harness, gear shift motor • Signal output harness, gear shift motor • Gear shift motor • Raider module, electric timeshar-ing
U0155	Signal failure, vehicle speed	• Fuse, vehicle body • Vehicle speed sensor harness, • Vehicle speed sensor, • Assembly instrument
U0423	Signal failure, vehicle speed	• Fuse, vehicle body • Vehicle speed sensor harness, • Vehicle speed sensor, • Assembly instrument
U0100	U0100 signal failure, clutch pedal position	• Clutch switch • Clutch switch harness • Control module, engine
U0401	U0100 signal failure, clutch pedal position	• Clutch switch • Clutch switch harness • Control module, engine
U0001	CAN bus disconnection	• Raider module, electric timeshar-ing • CAN harness
P0560	Systematic voltage exceeds normal work scope	• Battery • fuse • BCM control unit
P1728	Synchronization coil defects	• Electromagnetic clutch coil • Electromagnetic clutch coil wire • Raider module, electric timeshar-ing

DTC code	Diagnostic items (DTC definition)	Trouble location
P1729	Synchronization coil defects	• Electromagnetic clutch coil • Electromagnetic clutch coil wire • Raider module, electric timesharing
P1730	Synchronization coil defects	• Electromagnetic clutch coil • Electromagnetic clutch coil wire • Raider module, electric timesharing
P1734	Signal failure feedback, front axle clutch	• Control module wire, front axle clutch • Control module, front axle clutch • Raider module, electric timesharing
P1738	Switch defects, model choice	• Fuse, vehicle body • Switch wire • Central control switch block • Raider module, electric timesharing
P1780	,Motor failure, gear shift	• Gear shift motor assembly • Motor harness • Raider module, electric timesharing
P1781	,Motor failure, gear shift	• Gear shift motor assembly • Motor harness • Raider module, electric timesharing
P1782	,Motor failure, gear shift	• Gear shift motor assembly • Motor harness • Raider module, electric timesharing

U0101 SIGNAL FAILURE, GEAR
U0402 SIGNAL FAILURE, GEAR

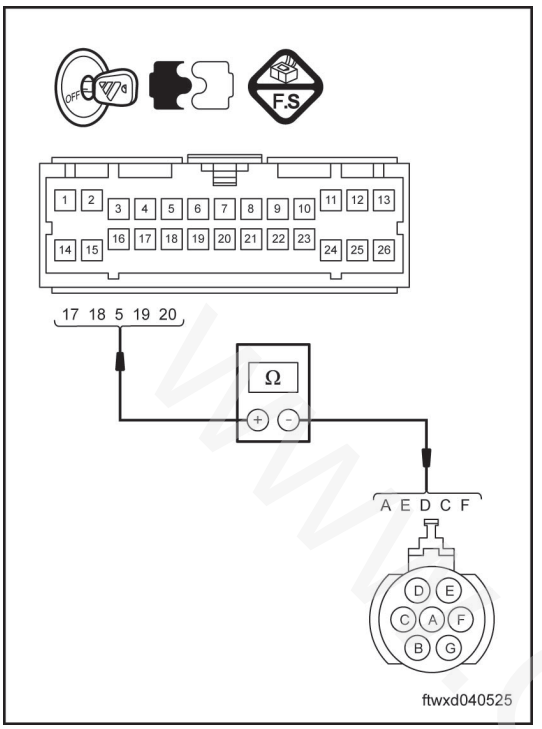
Circuit diagram



ftwxd040603

Diagnostic steps

1 . Measure the electrical resistance based on the value in the following form.



(a) Switchover the ignition switch to “OFF”.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C040(17)-K001(A)	＜2 Ω
C040(18)-K001(A)	＜2 Ω
C040(5)-K001(A)	＜2 Ω
C040(19)-K001(A)	＜2 Ω
C040(20)-K001(A)	＜2 Ω

Check whether the result is normal?

Yes> go to step 2

No> replace connection harness

2 . Check whether the output signal is normal.

(a) Start the vehicle
(b) Switchover transfer gear switch to different gears .
(c) Check whether there is voltage output.

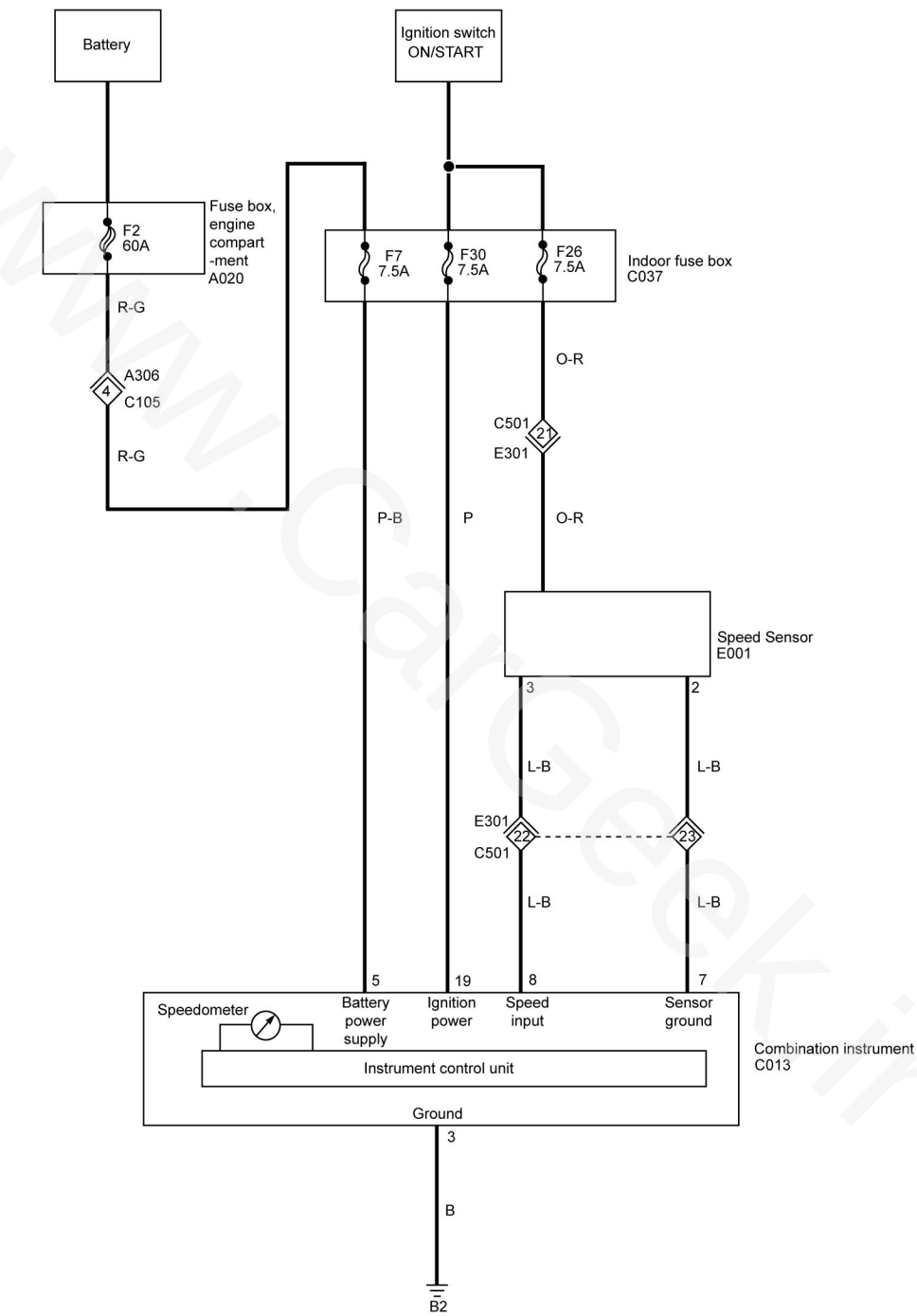
Check whether the result is normal?

Yes> Replacement motor assembly.

NO> Replace control unit.

SPEEDOMETER DEFECTS

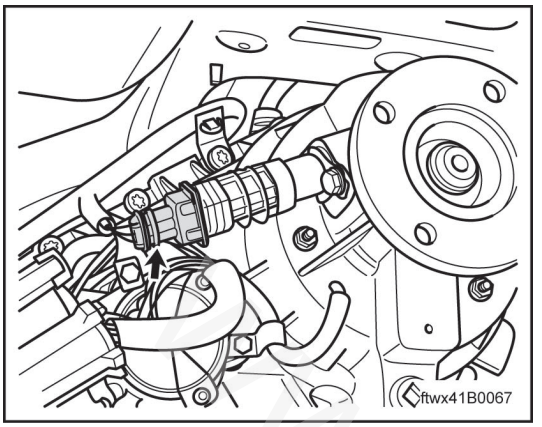
Circuit diagram



Diagnostic steps

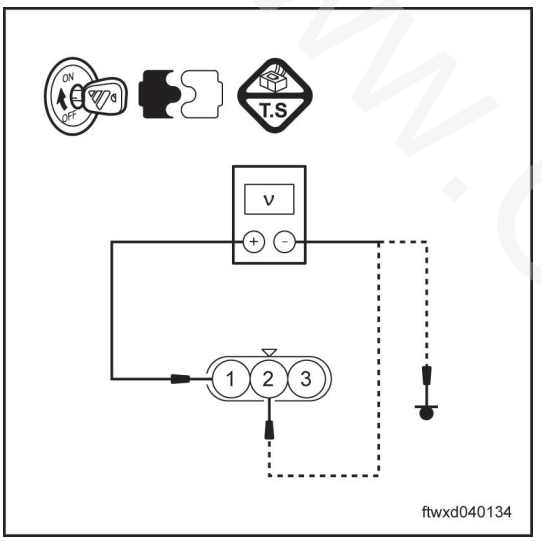
1 . Check operating voltage of the sensor , speedometer

(a) Ignition Switch: OFF.



(b) Disconnect speedometer E001 connector

(c) Ignition Switch: ON.



(d) Use multimeter to measure speedometer sensor E001 connector No.1 stitch and No.2 stitch respectively, and the voltage between No.1 stitch and ground connection.

Standard voltage

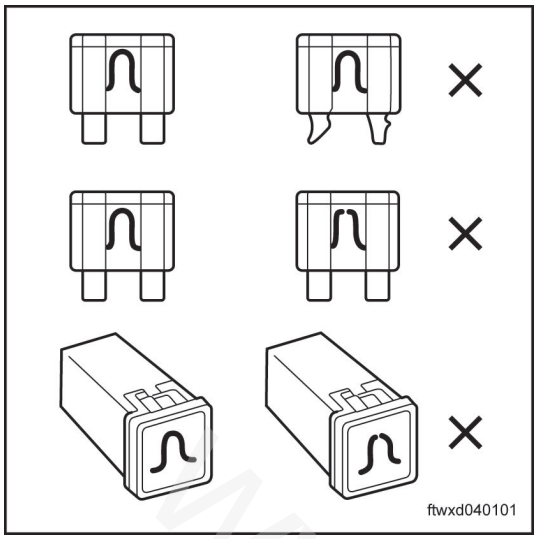
Multimeter connection	Standard value
E001 (1) - E001 (2)	Battery voltage
E001 (1) ground	

Check whether the result is normal?

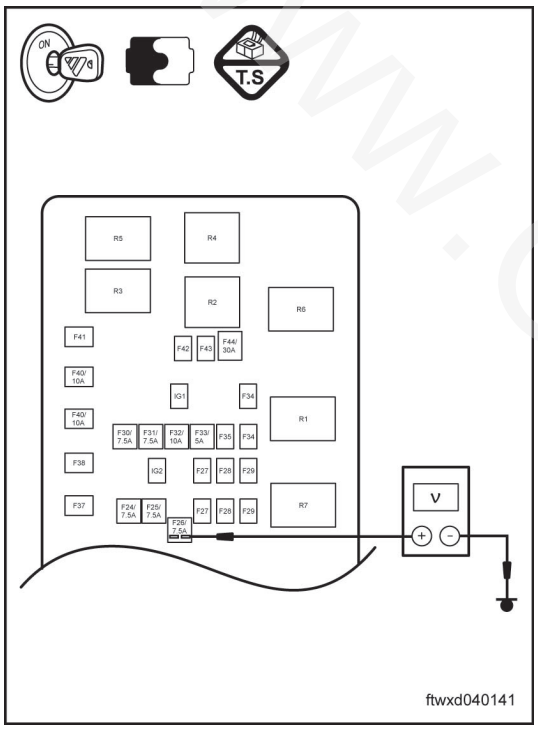
Yes> go to step 3

No> If both have no voltage, go to step2. If there is voltage between No.1 stitch and ground connection, repair the open circuit between No.2 stitch of the speed sensor E001 connector and No.7 stitch of assembly instrument C013 connector .

2 . Check supply circuit, speed sensor



(a) Check whether fuse F26 (7.5A) of the body is fusing or not.



(b) Use multimeter to measure the voltage between fuse F26 of the body and ground .

Standard voltage

Multimeter connection	Standard value
F26-ground	Battery voltage

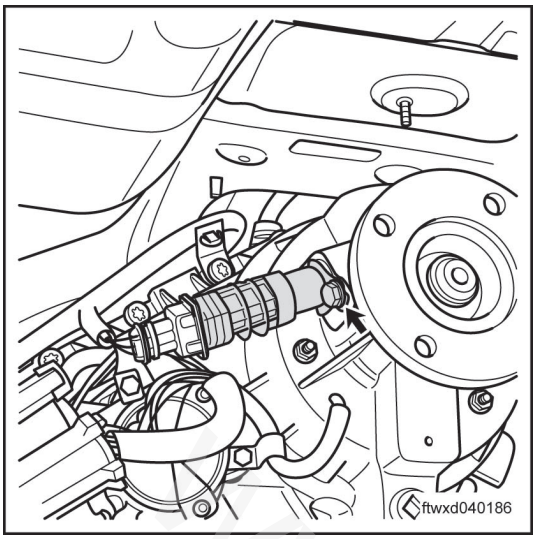
Check whether the result is normal?

Yes> go to step 3

No> Repair the circuit between fuse box of vehicle body: F26 (7.5A) and No.1 stitch of vehicle speed sensor E001 connector.

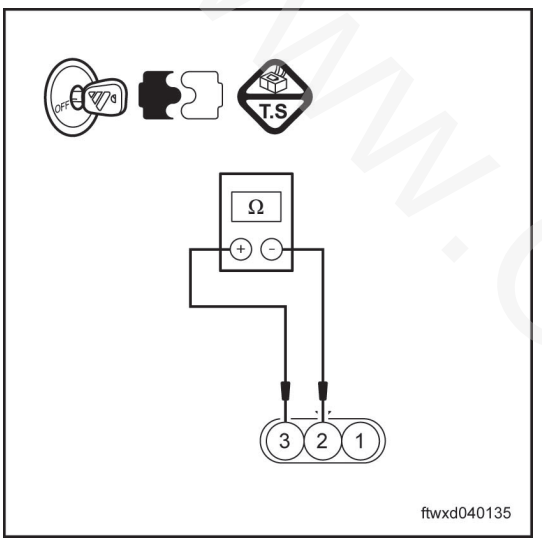
3 . Check speedometer sensor

(a) Ignition Switch: OFF.



(b) Dismantle vehicle speed sensor.

(c) Rotate the spindle of vehicle speed sensor.



(d) Use multimeter to measure the resistance between No.2 stitch speed sensor E001 connector and No.3 stitch.

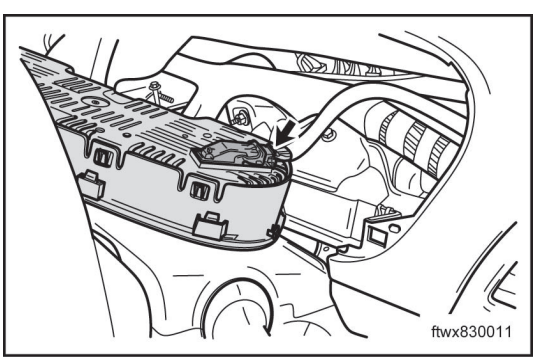
Pulse signal: each rotation should have 8 pulse resistance signal

Check whether the result is normal?

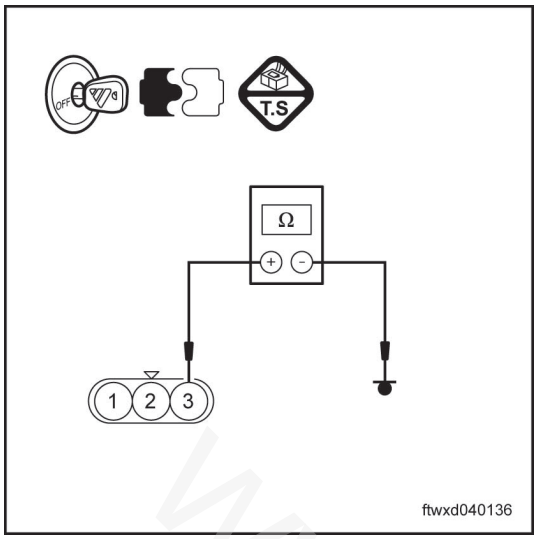
Yes> go to step 4

No> Replace speedometer sensor

4 . Check sensor signal circuit, speedometer

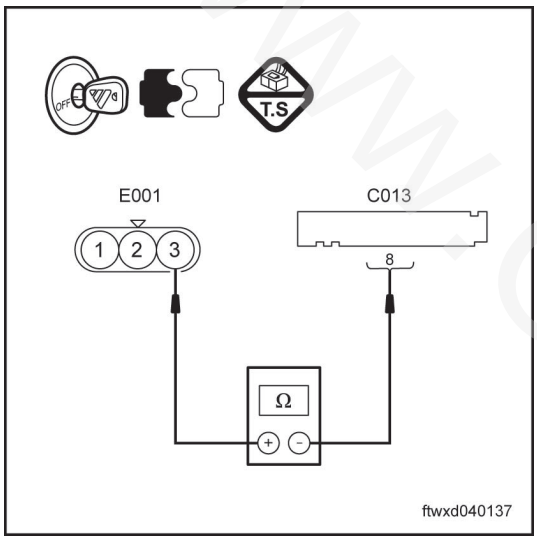


(a) Disconnect assembly instrument C013 connector



(b) Use multimeter to measure the resistance between No.3 stitch of speed sensor E001 connector and ground. **Standard resistance (check whether there is short circuit)**

Multimeter connection	Standard value
E001 (3) ground	⩾ 1 MΩ



(c) Use multimeter to measure the resistance between No.3 stitch speed sensor E001 connector and No.8 stitch of C013 connector. **Standard electrical resistance (check whether there existent an open circuit)**

Multimeter connection	Standard value
E001 (3) - C013 (8)	⩽ 2 Ω

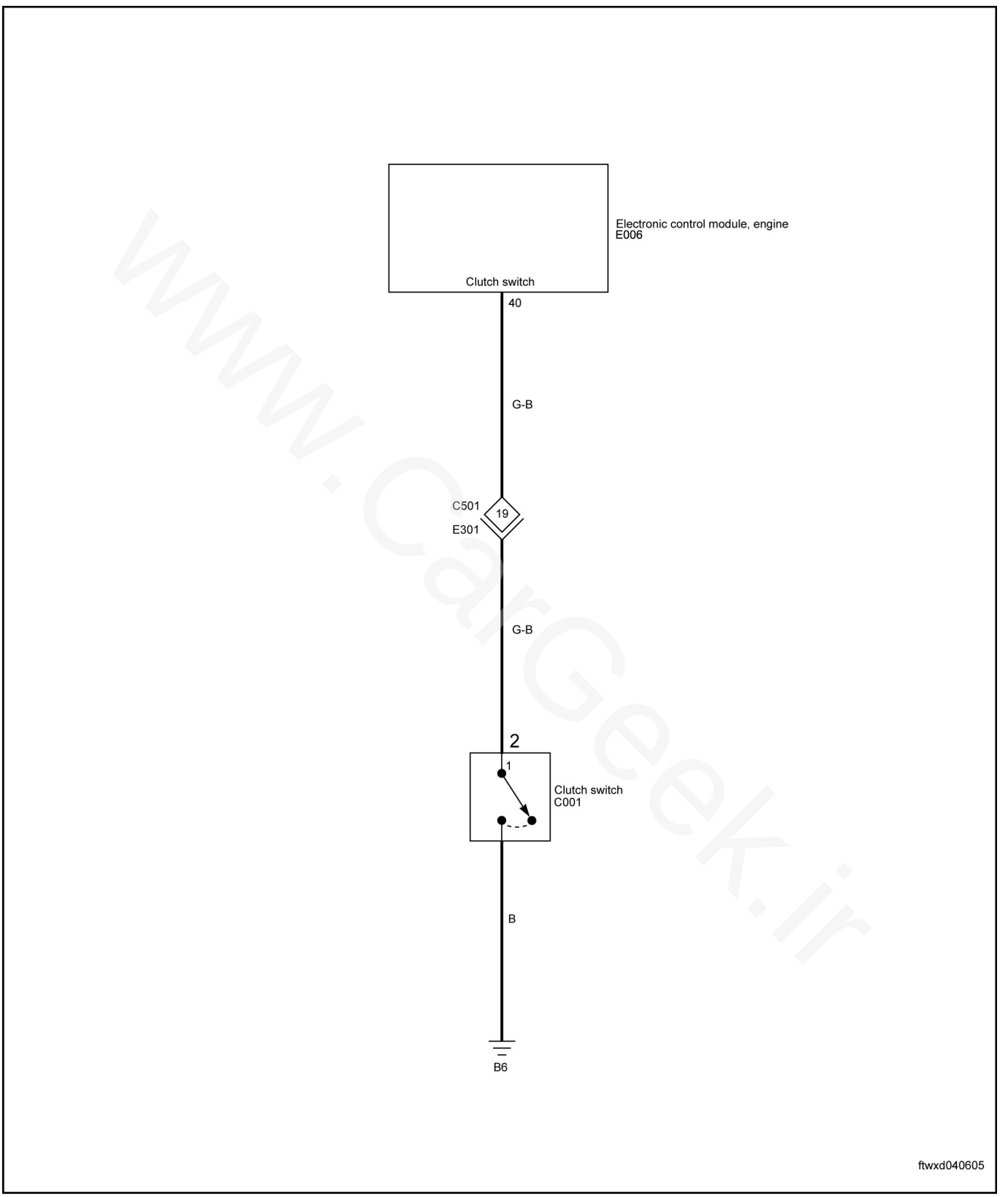
Check whether the result is normal?

Yes> replace combination instrument assembly.

No > Repair signal circuit between No.3 stitch of speed sensor E001 connector and No.8 stitch of combination instrument C013 connector

U0100 SIGNAL FAILURE, CLUTCH PEDAL POSITION
U0401 SIGNAL FAILURE, CLUTCH PEDAL POSITION

Circuit diagram



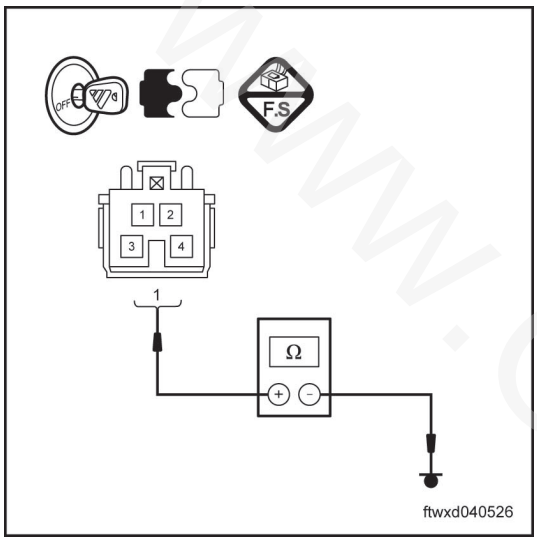
Diagnostic steps

1 . Check clutch switch

(a) Pedal and loosen clutch pedal.
(b) Disconnect the connector, clutch switch.
(c) Check the resistance, clutch switch

Multimeter connection	Standard value
Pedal: C001(1)-COO1(2)	＜2 Ω
Loosen: C001(1)-COO1(2)	>1K Ω

2 . Measure the electrical resistance based on the value in the following form.



(a) Switchover the ignition switch to “OFF”.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
E006 (40) - COO1 (2)	＜2 Ω
COO1 (1) ground	＜2 Ω

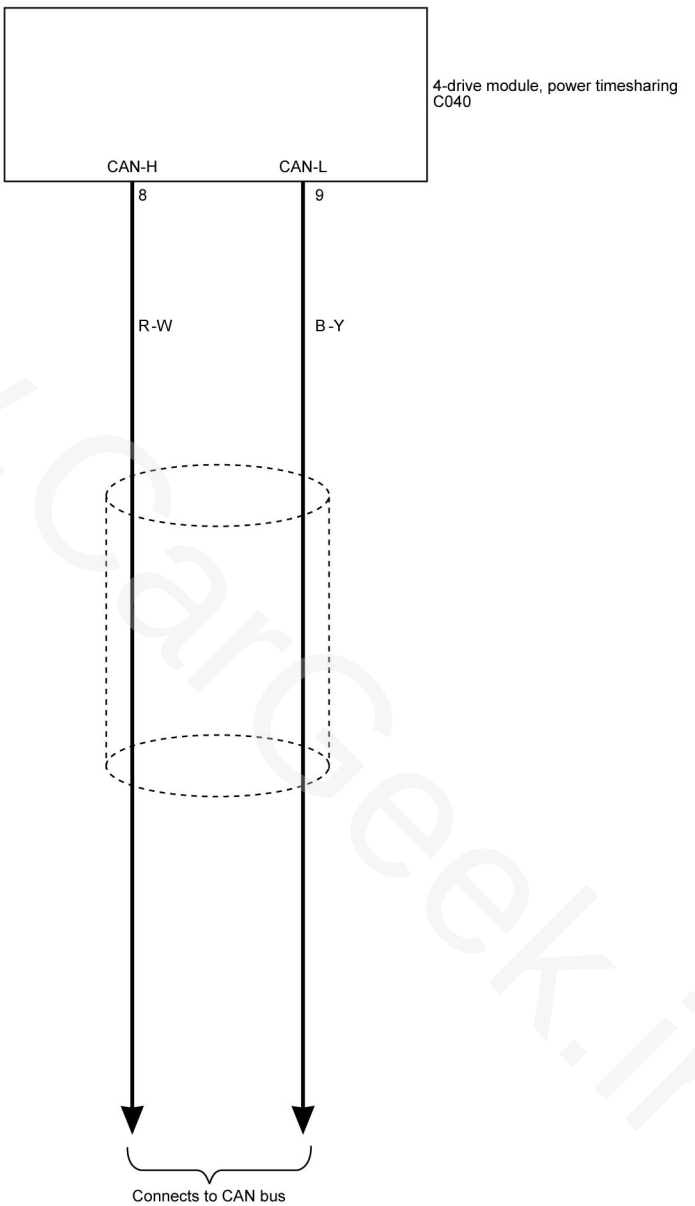
Check whether the result is normal?

Yes> replace engine control unit

No> replace connection harness

U0001 CAN BUS DISCONNECTION

Circuit diagram



ftwxd040606

Diagnostic steps

1 . Check the harness

(a) Turn on the ignition switch.
(b) Rotate gear switch, and switchover 2 drive and 4 drive.
(c) Check whether 4 drive of electric timesharing module(8,9) has voltage output.

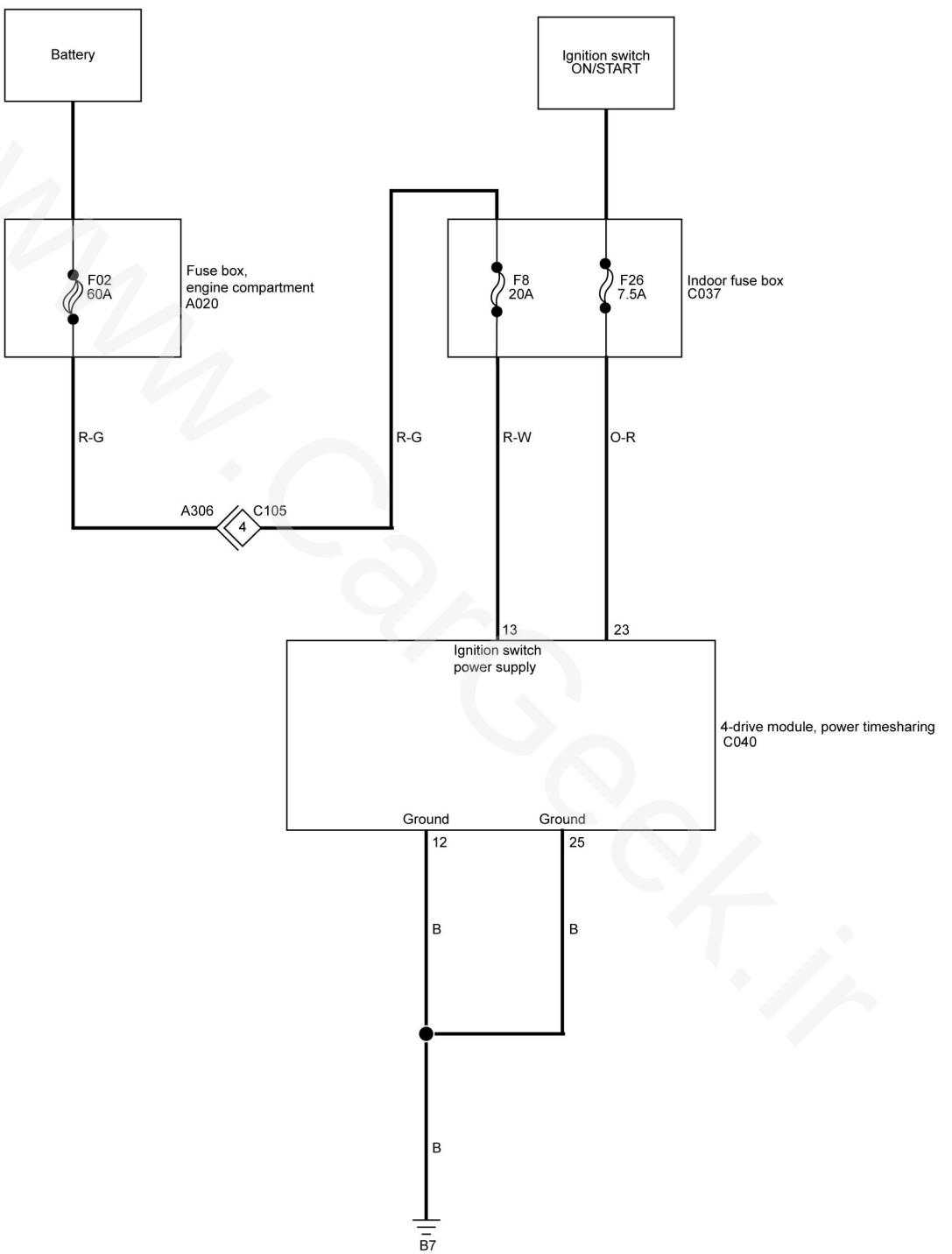
Check whether the result is normal?

Yes> replace CAN wire.

No> Replace 4-drive module, electric timesharing.

P0560 SYSTEMATIC VOLTAGE EXCEEDS NORMAL WORK SCOPE

Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.

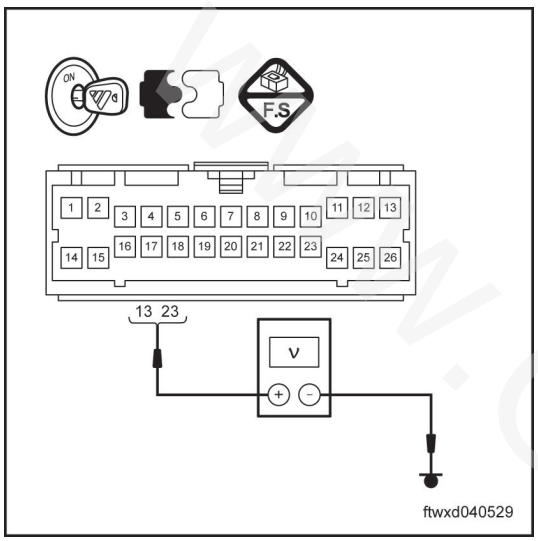
(b) Check whether the fuse of the interior fuse box: F8 (20A), F26 (7.5A) is fusing or not.

Check whether the result is normal?

Yes> go to step 2

No> replace fuse

2 . Check power supply circuit of 4-drive module ofelectric timesharing



(a) Ignition Switch: ON.

(b) Disconnect 4-drive module C040 connector of electric timesharing.

(c) Use multimeter to measure 4-drive module C040 of electric timesharing.

Voltage between connectors No.13 and 23 ground connection.

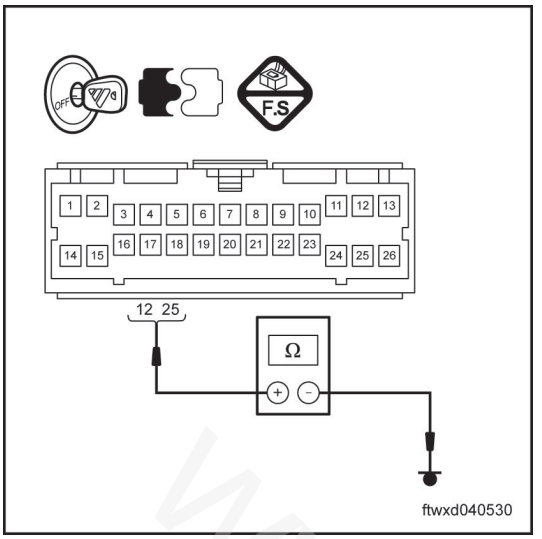
Multimeter connection	Standard value
C040 (13) ground	Battery voltage
C040 (23) ground	

Check whether the result is normal?

Yes> go to step 3

No> If No.13 stitch of C040 connector of 4-drive electric timesharing has no battery voltage, repair the open circuit from fuse F8 (20A) to No.13 stitch of C040 connector of the 4-drive module of electric timesharing. If No.23 stitch of C040 connector of 4-drive electric timesharing has no battery voltage, repair the open circuit from fuse F26 (7.5A) to No.23 stitch of C040 connector of the 4-drive module of electric timesharing.

3 . Check power supply ground connection of 4-drive module electric timesharing



(a) Ignition Switch: OFF.

(b) Use multimeter to measure the resistance between No.13 and 23 stitch of C040 connector of 4-drive module of electric timesharing, and the ground respectively.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C040 (12) ground	⩽ 2 Ω
C040 (25) ground	

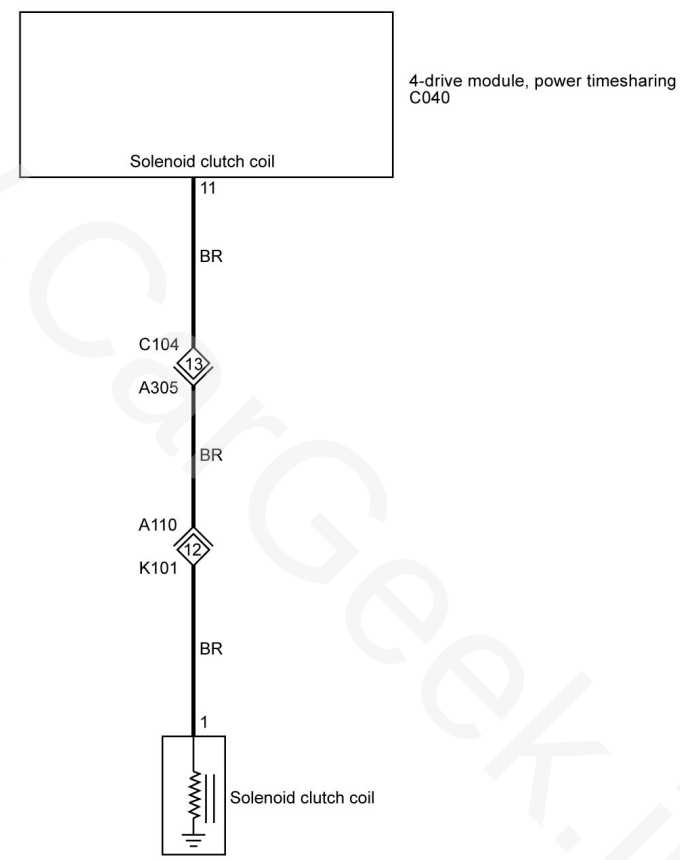
Check whether the result is normal?

Yes> replace combination instrument assembly.

No> repair the circuit between No. 12 and 25 Stitches of C040 connector of 4-drive module of electric timesharing, and the ground.

P1728 SYNCHRONIZATION COIL DEFECTS
P1729 SYNCHRONIZATION COIL DEFECTS
P1730 SYNCHRONIZATION COIL DEFECTS

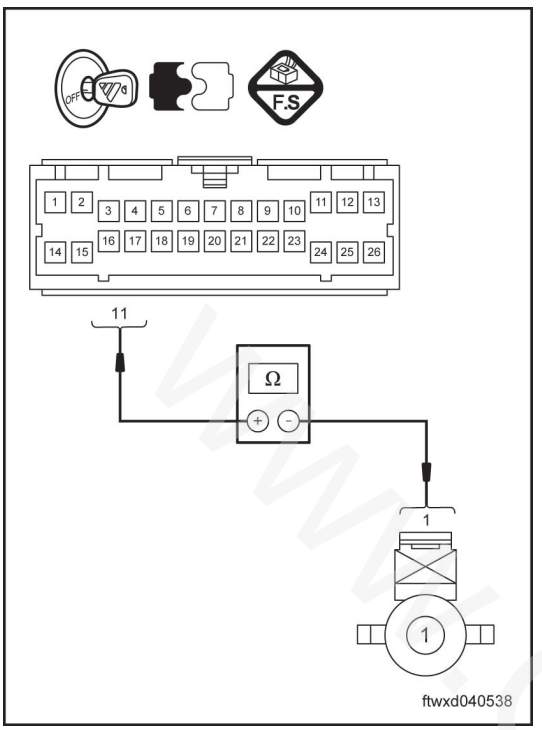
Circuit diagram



ftwxw710440

Diagnostic steps

1 . Check synchronization coil



(a) Disconnect coil connector of electromagnetic clutch.
(b) Check the resistance of electromagnetic clutch coil.

Check whether the result is normal?

Yes> go to step 2

No> Replace clutch coil of the battery.

2 . Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C040(11)-electromagnetic clutch coil (1)	< 2 Ω

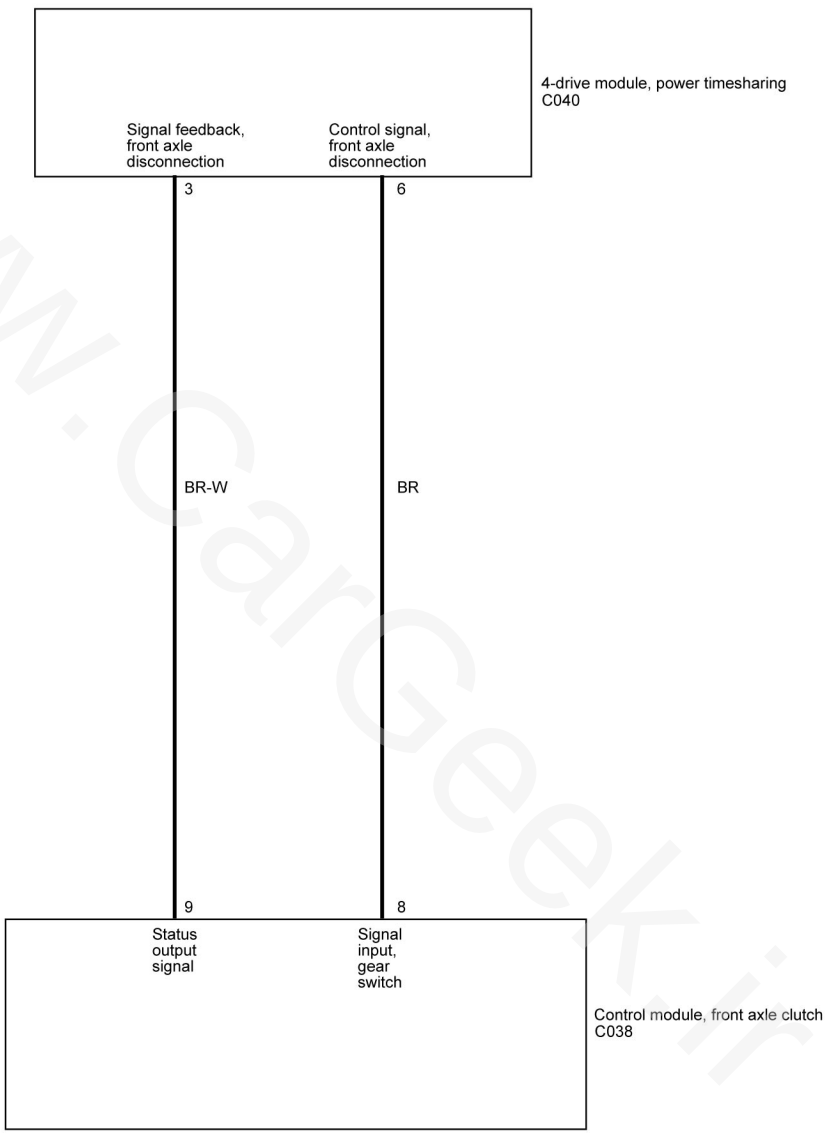
Check whether the result is normal?

Yes> replace 4-drive module, electric timesharing.

No> replace connection harness

P1734 SIGNAL FAILURE FEEDBACK, FRONT AXLE CLUTCH

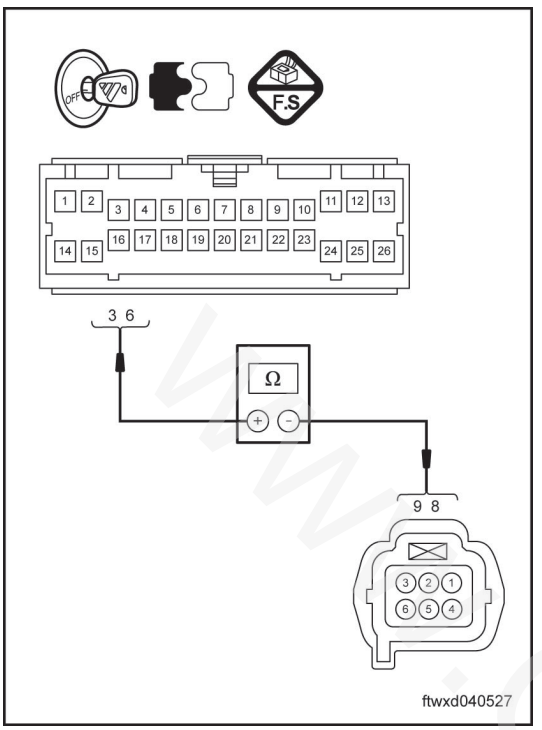
Circuit diagram



ftwxd040609

Diagnostic steps

1 . Check connection harness



(a) Switchover the ignition switch to “OFF”.

(b) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C040(3)-C038(9)	＜2 Ω
C040(6)-C038(8)	

Check whether the result is normal?

Yes> go to step 2

No> replace connection harness

2 . Check whether there is signal output.

(a) Turn on the ignition switch.

(b) Pedal clutch pedal.

(c) Swithover 2-drive and 4-drive

(d) Check whether the output signal is normal.

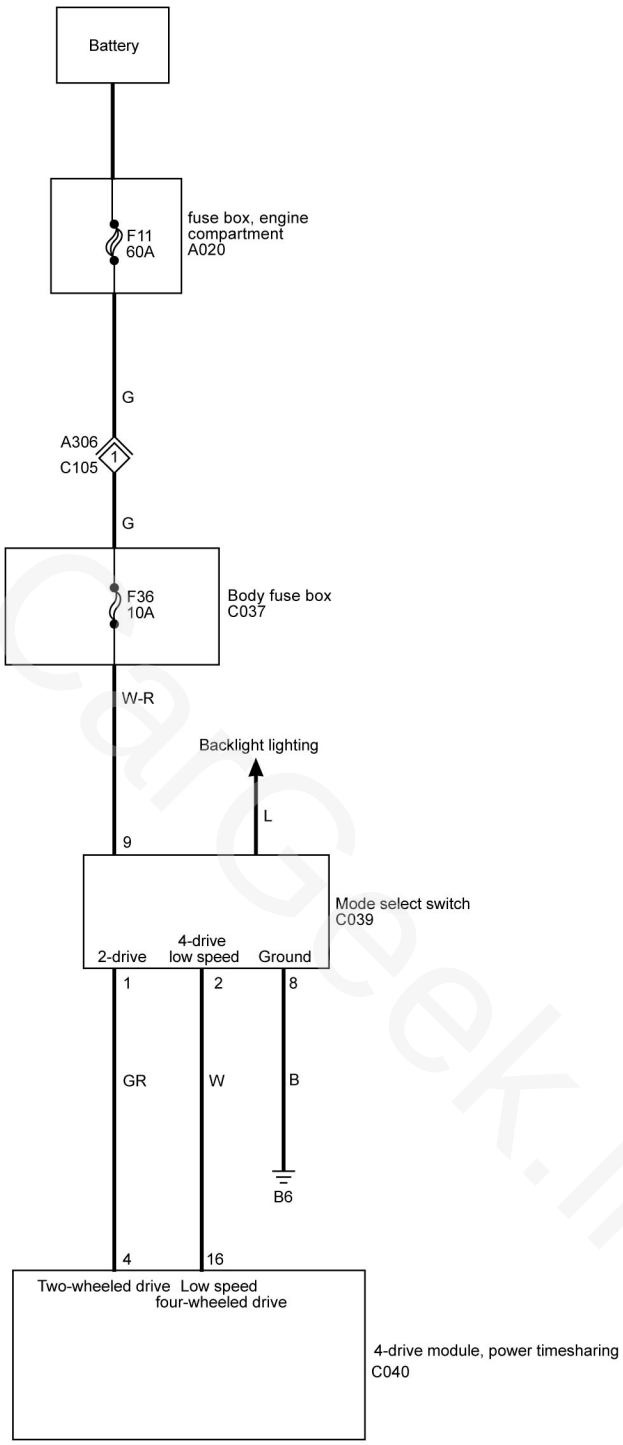
Check whether the result is normal?

Yes> 4-drive module, electric timesharing

No> replace control module , front axle clutch

P1738 DEFECTS, MODE SELECT SWITCH

Circuit diagram



ftwxd040610

Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.

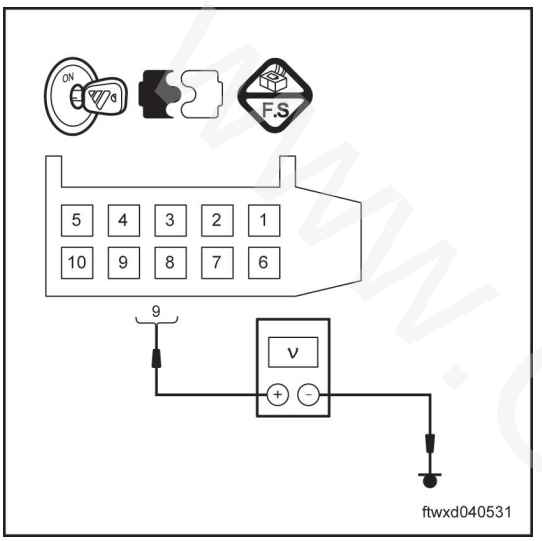
(b) Check whether the fuse of fuse box: F11(60A), F36(10A) is fusing or not.

Check whether the result is normal?

Yes> go to step 2

No> replace fuse

2 . Check C039 power supply circuit, mode select switch.



(a) Ignition Switch: ON.

(b) Disconnect C039 connector, mode select switch.

(c) Use multimeter to measure the voltage between No.9 stitch of C039 connector of mode select switch and the ground connection.

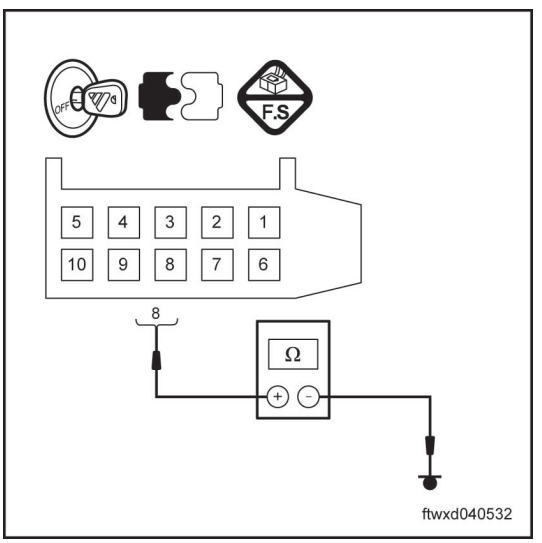
Multimeter connection	Standard value
C039 (9) ground	Battery voltage

Check whether the result is normal?

Yes> go to step 3

No> if there is no battery voltage at No.9 stitch of C039 connector of mode select switch, repair the open circuit between Fuse F36 (10A) and No.6 stitch of C039 connector of the mode select switch.

3 . Check power supply ground connection of 4-drive module electric timesharing



(a) Ignition Switch: OFF.

(b) Use multimeter to measure the voltage between No.8 stitch of C039 connector of mode select switch and the ground connection.

Standard electrical resistance (check whether there existent an open circuit)

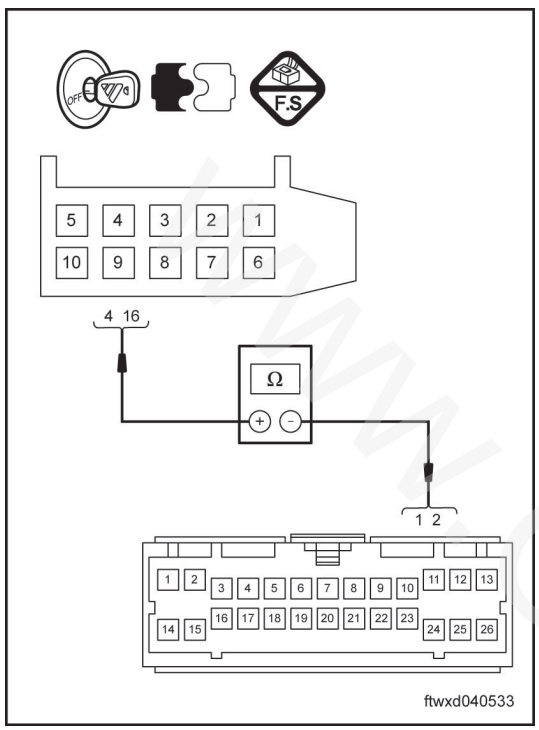
Multimeter connection	Standard value
C039 (8) ground	$\leqslant 2\ \Omega$

Check whether the result is normal?

Yes> go to step 4

No> Repair the circuit between No.8 stitch of C039 connector of mode select switch and ground connection.

4 . Check control circuit.



(a) Ignition Switch: ON.

(b) Use multimeter to measure the resistance between No.1 and 2 stitches of C039 connector of mode select switch and the connectors 4 and 16 of 4-drive module C040of electric timesharing.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C040(4)- C039(1)	⩽ 2 Ω
C040(16)- C039(2)	

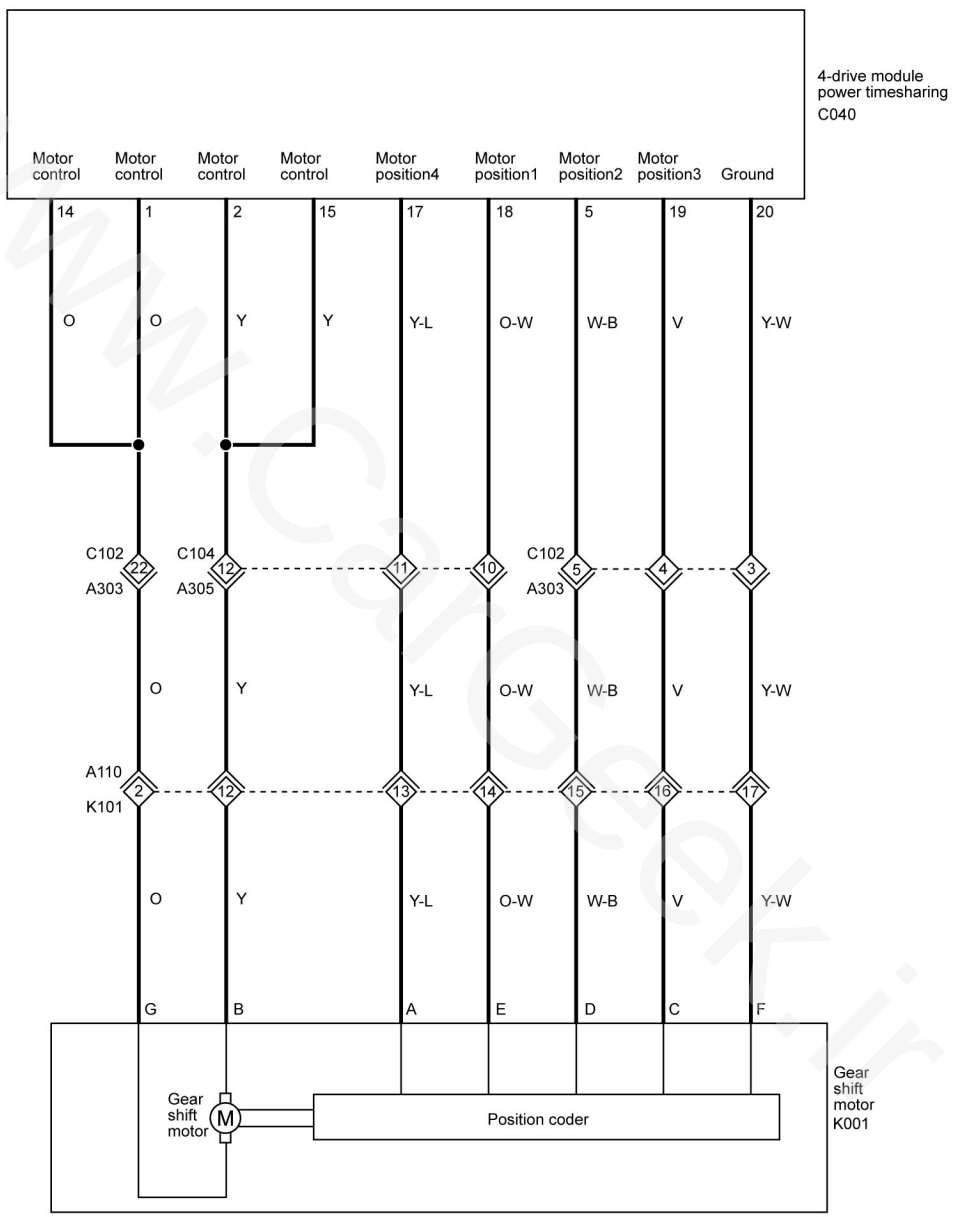
Check whether the result is normal?

Yes> replace mode select switch.

No>repair the circuit between No.1 and 2 stitches of C039 connector of mode select switch and connectors 4 and 16 of 4-drive module C040 of electric timesharing.

P1780 MOTOR DEFECTS, GEAR SHIFT
P1781 MOTOR DEFECTS, GEAR SHIFT
P1782 MOTOR DEFECTS, GEAR SHIFT

Circuit diagram



ftwxd040603

Diagnostic steps

1 . Check motor

(a) Disconnect the connector.

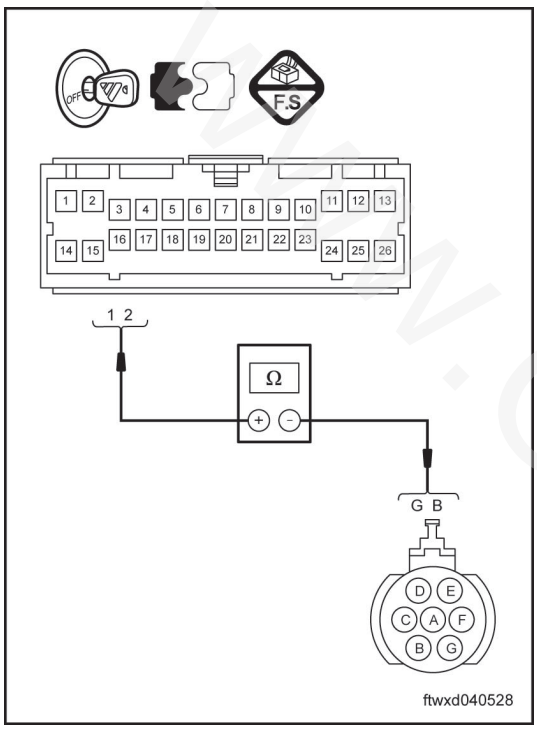
(b) Check whether the resistance of motor is normal or not.

Check whether the result is normal?

Yes> go to step 2

No> Replace motor assembly.

2 . Check whether the wire is normal of not.



(a) Switchover the ignition switch to “OFF”.

(b) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C040(1)-K001(G)	＜2 Ω
C040(2)-K001(B)	＜2 Ω

Check whether the result is normal?

Yes> Replace 4-drive module, electric timesharing

No> replace connection harness

REVERSE RADAR SYSTEM

PRECAUTION

1 . Check causes for the abnormal test functions of the reverse radar system:

(a) The probe of reverse radar is covered by mud or snow and other impurities (the test functions will recover after cleaning the sensor).

(b) The reverse radar sensor is freezed (the test functions will return to normal after the temperature of the sensor rises).

(c) The reverse radar probe is covered.

2 . The test scope is affected by the following conditions:

(a) The reverse radar probe is covered by the mud or snow and other impurities.

(b) The vehicle is located at the extremely hot or cold areas.

3 . The reverse radar probe may encounter test errors, for example:

(a) The vehicle will travel on rugged roads, unpaved roads or in the tall glasses.

(b) The horn sound, engine sound of motorcycle, the sound of air brake of large vehicles or the ultrasonic wave of the sonar of another vehicle transmitted from nearby.

(c) In case of heavy rain, or the reverse radar probe exposed to water.

(d) The vehicle slants substantially.

(e) The vehicle is equipped with additional purchased protection rod or wireless core antenna.

(f) The reverse radar probe is covered by the mud or snow and other impurities.

(g) The vehicle is moving toward the edge of the object.

4 . The reverse radar probe can not test some objects:

(a) Such as line, rope and other thin objects.

(b) Such as cotton, snow and other material that can absorb ultrasonic

(c) Objects whose edges are sharp

(d) Short and small objects

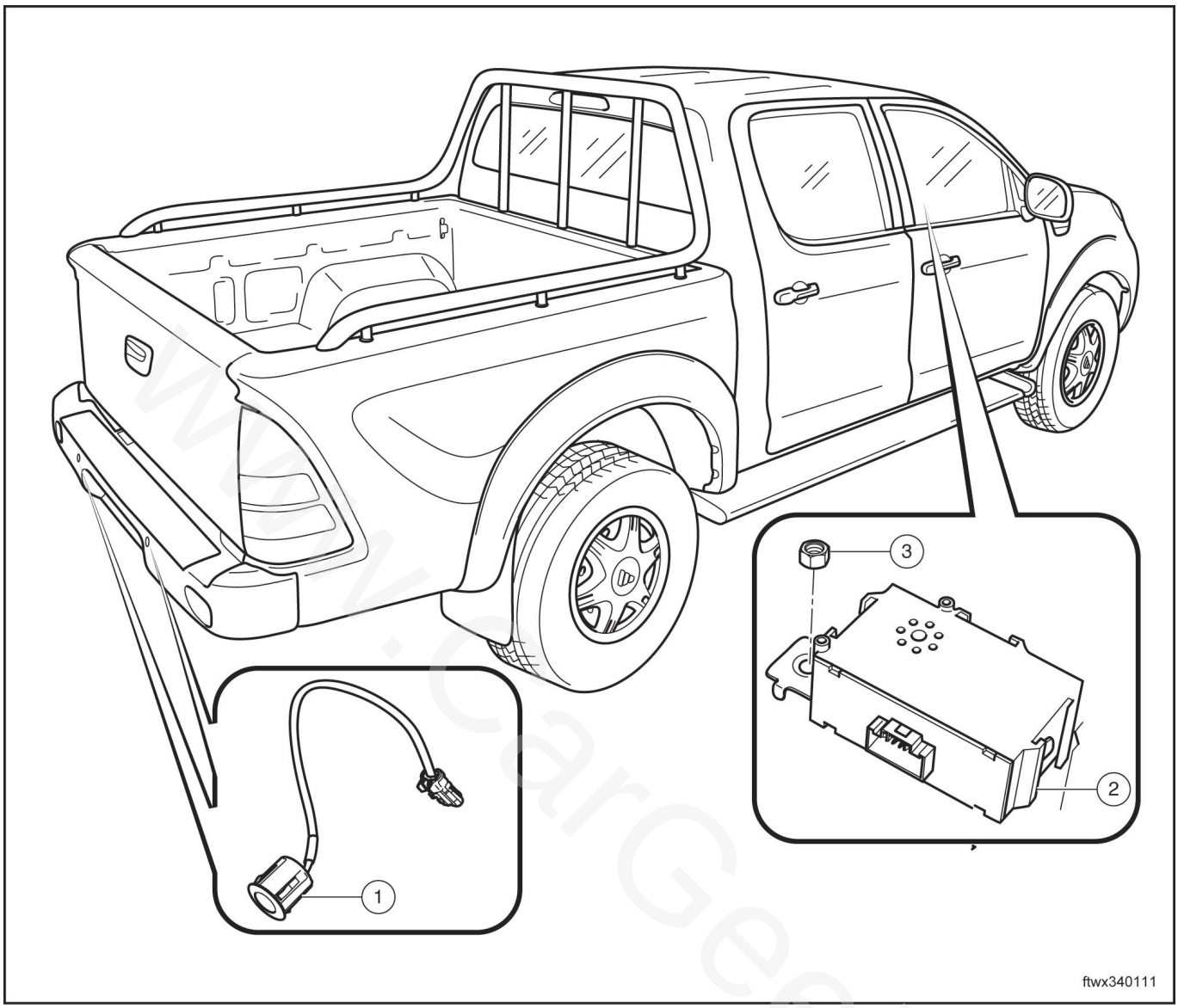
5 . Other precautions:

(a) The reverse radar probe cannot check the objects directly under the beam.

(b) The reverse radar probe cannot check obstacles too close to it.

(c) The reverse radar probe cannot check the obstacles if it drops or is fiercely shocked.

COMPONENTS DRAWING



1	Reverse Radar Probe
2	Reverse Radar Controller

3	Fixed bolt, reverse radar controller

SYSTEM SPECIFICATION

1 . Summary

After the objects are emitted by ultrasonic wave, a set of reflected wave will return to reverse radar probe, and radar controller uses the interval time between emission wave and reflected wave to measure the distance, so as to remind the driver that there are obstacles at the rear.

2 . Components functions

Components	Function
Reverse Radar Probe	• Check the distance between the vehicle and the obstacles.
Intermittent buzzer	• According to the distance of the obstacles, buzz to inform the driver.
Reverse Radar Controller	• Judge the rough distance between the vehicles and the obstacles based on the signals from ultrasonic sensor.
Switch, reverse lamp	• Send the reverse signal to reverse radar probe.

3 . Self-check functions of reverse radar probe

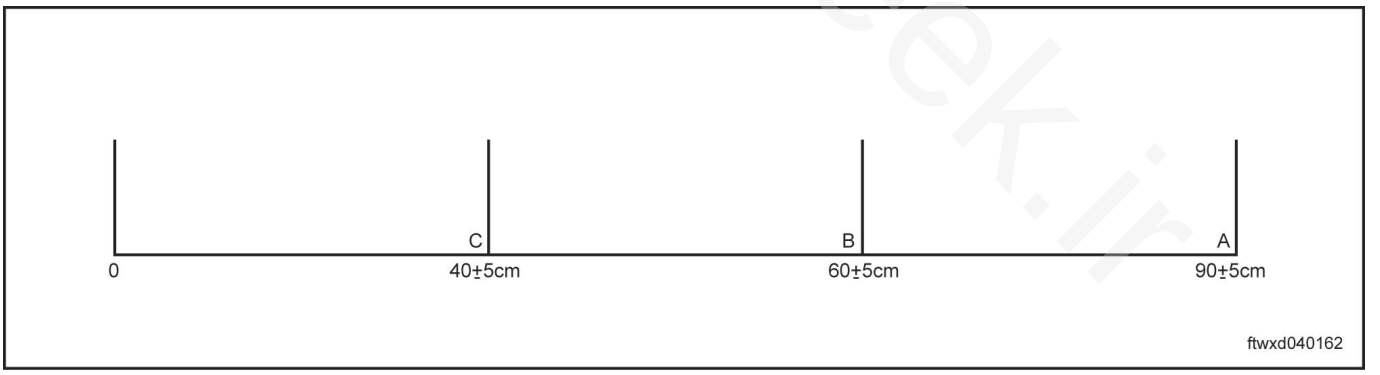
(a) Turn the ignition switch to “ON”.

(b) Transfer to reverse gear and reverse radar probe self checks.

- If the function of reverse radar probe is normal, then the buzzer will buzz once and the buzzing time is 0.5 seconds.
- If the function of one of the reverse radar probes are abnormal, then the buzzer will buzz two times and the buzzing time is 0.5 seconds with interval of 0.5 seconds.
- If the function of two of the reverse radar probes are abnormal, then the buzzer will buzz three times and the buzzing time is 0.5 seconds with interval of 0.5 seconds.

4 . The check scope and the segmentation of reverse radar probe

(a) The check scope and the segmentation of reverse radar probe on both sides

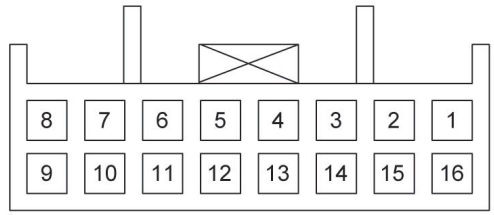


5 . The distance of the obstacles, the response frequency of the buzzer and buzz methods

Sequence number	Obstacle distance	Buzz methods of the buzzer	Buzz methods of the buzzer
A	**90 - 150 cm**	**Long intermittent sound**	**1 Hz**
B	**60 - 90 cm**	**Short intermittent sound**	**2 Hz**
C	**40 - 60 cm**	**Rapid intermittent sound**	**4 Hz**

Sequence number	Obstacle distance	Buzz methods of the buzzer	Buzz methods of the buzzer
D	Within 40± 5 cm	Long buzz	Long buzz

6 . Reverse Radar Controller Stitch



ftwxd040519

Stitch number	Connection rod color	Description	Stitch number	Connection rod color	Description
1	-	-	9	-	-
2	Grey	Left side sensor signal	10	-	-
3	-	-	11	-	-
4	-	-	12	-	-
5	-	-	13	-	-
6	-	-	14	-	-
7	-	-	15	Green-black	Right side sensor signal
8	Yellow	Reverse signal input	16	Black	ground

DEFECT PHENOMENON FORM

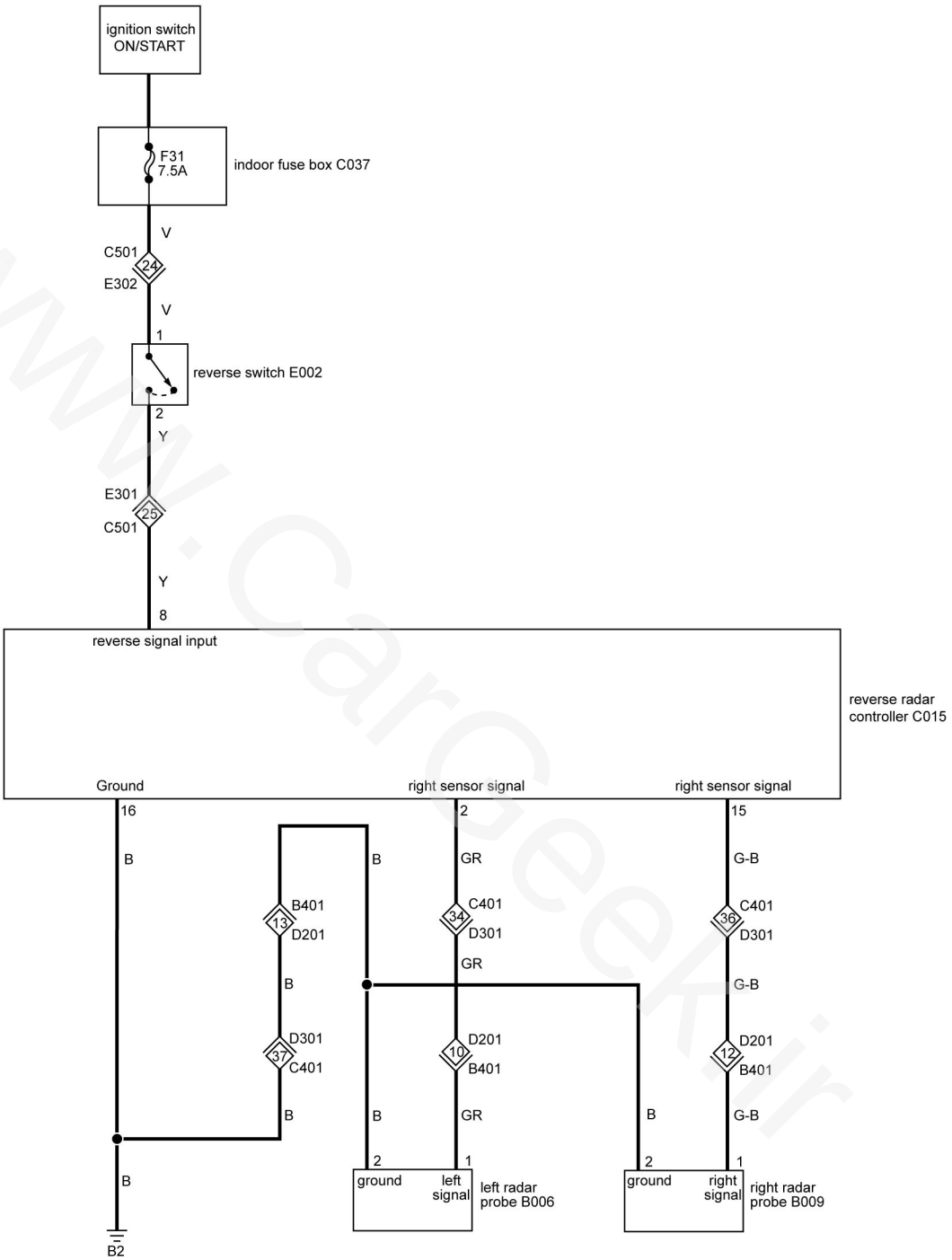
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Defect phenomenon	Suspect Area	Reference
Reverse radar system doesn't work at all	1. Fuse	-
	2. Reverse switch	Chapter 41 transmission-gear box assembly, replacement
	3. Harness	-
	4. Reverse Radar Controller	Chapter 8. Information system - reverse radar controller, replacement
Reverse radar system self-check abnormal	Reverse Radar Sensor	Chapter 81 Information system - reverse radar probe, replacement
	2. Reverse Radar Controller	Chapter 8. Information system - reverse radar controller, replacement
Before entering reverse gear, reverse radar appear working phenomenon	1. Reverse switch	Chapter 41 transmission-gear box assembly, replacement
	Reverse Radar Probe	Chapter 81 Information system - reverse radar probe, replacement
	3. Reverse Radar Controller	Chapter 8. Information system - reverse radar controller, replacement
Enter reverse gear, and the obstacle is within the distance of effective sense, and the reverse radar doesn't work (reverse switch, normal)	1. Fuse	-
	2. Harness	-
	3.Reverse Radar Sensor	Chapter 81 Information system - reverse radar probe, replacement
	4. Reverse Radar Controller	Chapter 8. Information system - reverse radar controller, replacement
Enter reverse gear, no obstacles behind the vehicles and the reverse radar system is abnormal	1. Harness	-
	2. Reverse switch	Chapter 41 transmission-gear box assembly, replacement
	3.Reverse Radar Sensor	Chapter 81 Information system - reverse radar probe, replacement
	4. Reverse Radar Controller	Chapter 8. Information system - reverse radar controller, replacement
The obstacle is within the distance of effective sense, and the buzzer doesn't work or is abnormal	1. Harness	-
	2.Reverse Radar Sensor	Chapter 81 Information system - reverse radar probe, replacement
	3. Reverse Radar Controller	Chapter 8. Information system - reverse radar controller, replacement

REVERSE RADAR SYSTEM DOESN’T WORK AT ALL

Circuit diagram

reverse radar system



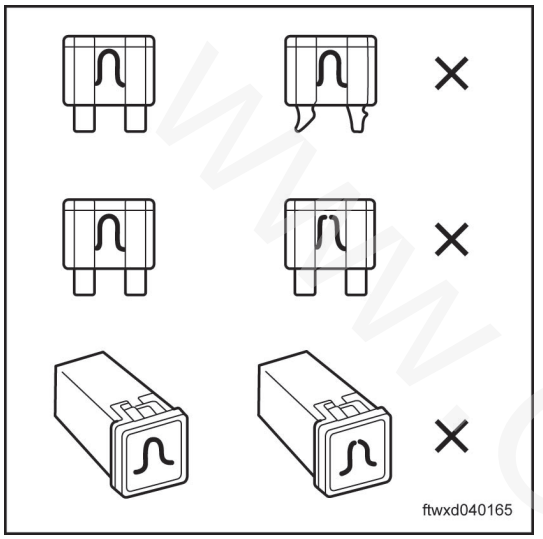
Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.
(b) Turn on interior fuse box (C037).
(c) Pull out reverse radar fuse: F31 (7.5A).

CAUTION

Dismantle of the fuse needs special fuse detacher, don’ t pull it out with hands directly in order to avoid damages.



(d) Check interior fuse box (C037) fuse: F31 (7.5A).

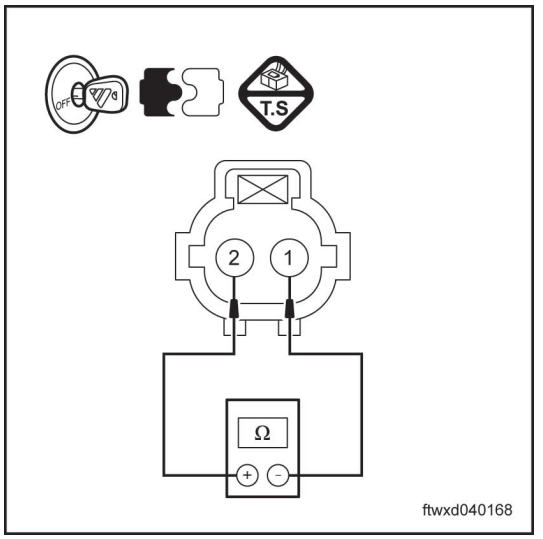
Check whether the result is normal?

Yes> go to step 2

No> replace fuse

2 . Check reverse switch

(a) Ignition Switch: OFF.
(b) Disconnect reverse switch connector E002.



(c) Use multimeter to measure reverse switch.

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Place in reverse gear	1 - 2	＜2Ω
Retreat from reserve gear	1 - 2	≥1 MΩ

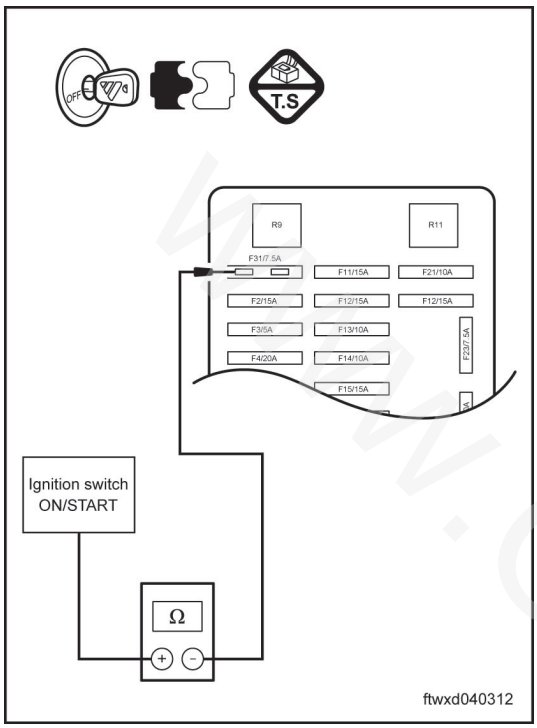
Check whether the result is normal?

Yes> go to step 3

No> replace reverse switch

3 . Check the harness and connector (ignition switch-fuse)

(a) Ignition Switch: OFF.



(b) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F31 (7.5A) Ignition switch	＜2 Ω

Check whether the result is normal?

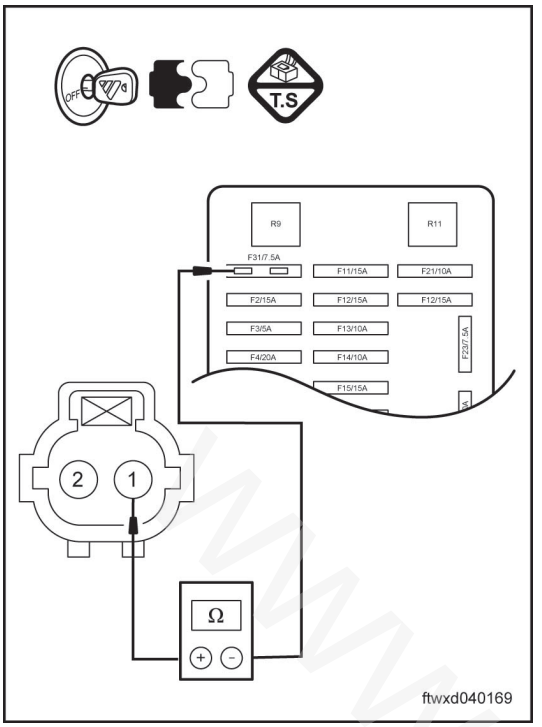
Yes> go to step 4

No > Maintenance or replace harness.

4 . Check the harness and connector (fuse- reverse switch)

(a) Ignition Switch: OFF.

(b) Disconnect reverse switch connector E002.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F31(7.5 A） - E002 （1）	＜2Ω

Check whether the result is normal?

Yes> go to step 5

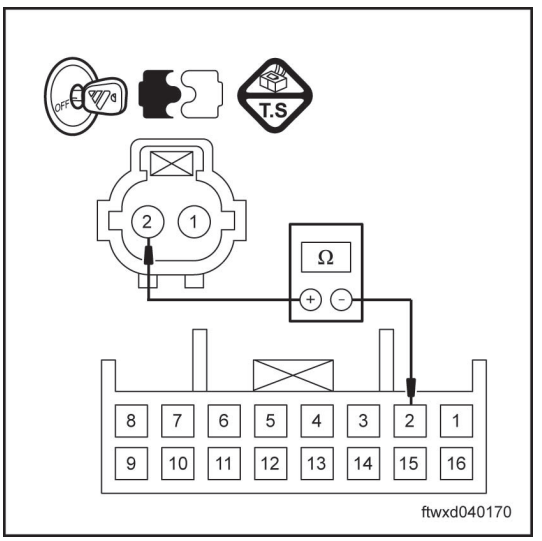
No > Maintenance or replace harness.

5 . Check harness and connector (reverse switch-reverse radar controller)

(a) Ignition Switch: OFF.

(b) Disconnect reverse switch connector E002.

(c) Disconnect connector C015, reverse radar controller



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
E002 (2) - C015 (8)	＜2Ω

Check whether the result is normal?

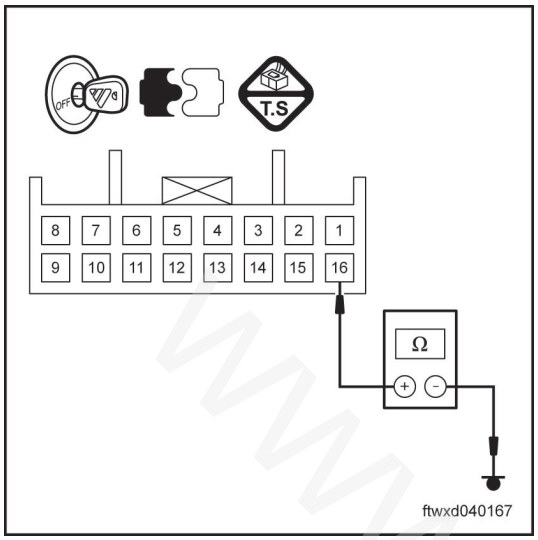
Yes> go to step 6

No > Maintenance or replace harness.

6 . Check harness and connector (reverse radar controller-ground)

(a) Ignition Switch: OFF.

(b) Disconnect connector C015, reverse radar controller



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C015 (16) ground	⩾1MΩ

Check whether the result is normal?

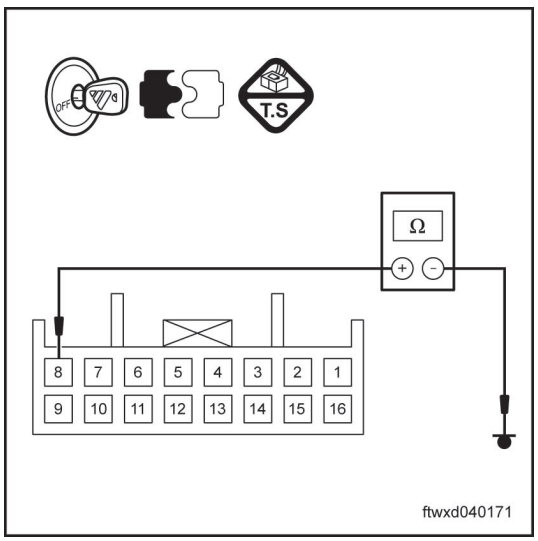
Yes> go to step 7

No > Maintenance or replace harness.

7 . Check whether the result is normal?

(a) 1) Ignition Switch: OFF.

(b) Disconnect connector C015, reverse radar controller



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there is short circuit)

Multimeter connection	Standard value
C015 (8) ground	⩾1MΩ

Check whether the result is normal?

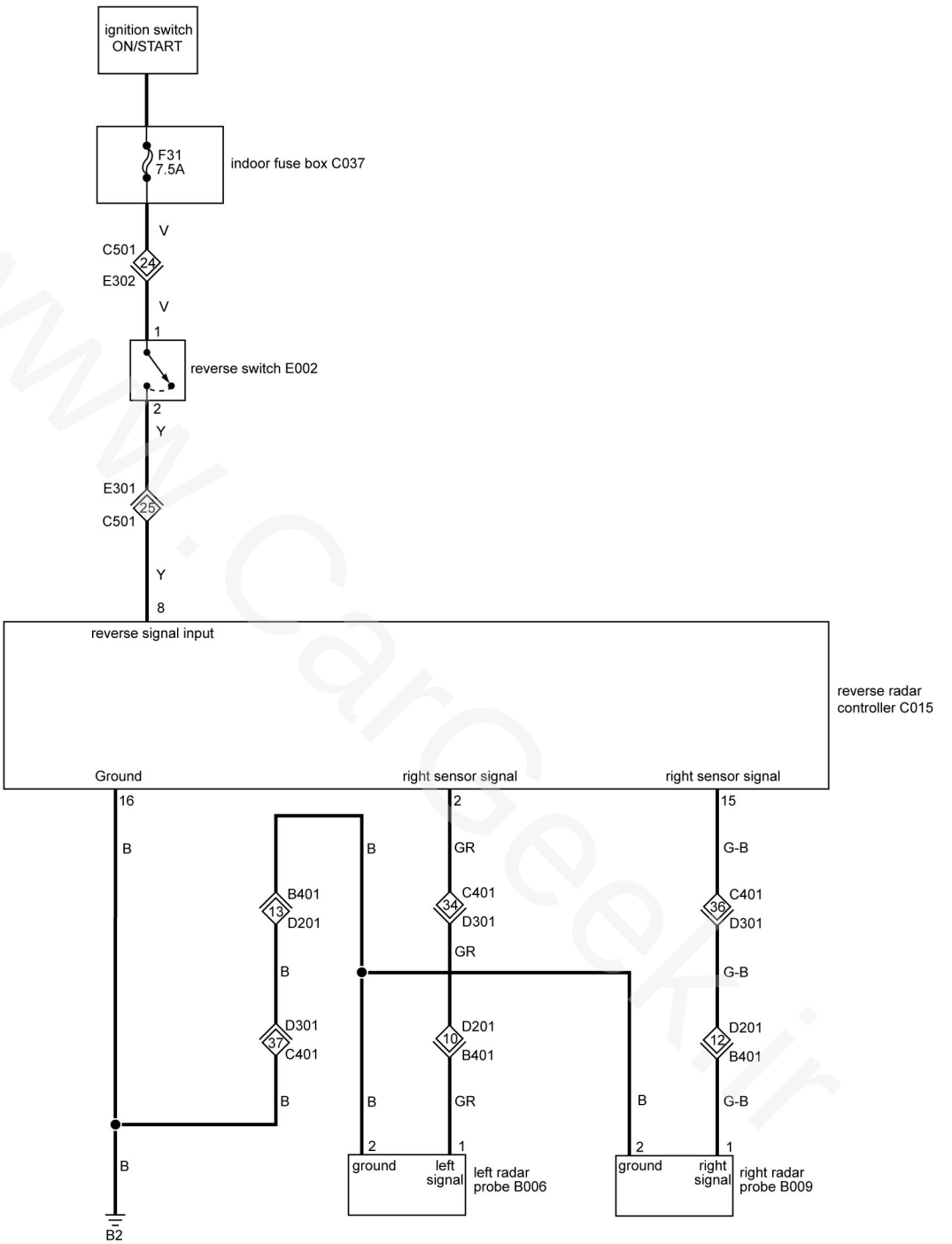
Yes>Replacement (Reverse Radar Controller)

No > Maintenance or replace harness.

REVERSE RADAR SYSTEM SELF-CHECK ABNORMAL

Circuit diagram

reverse radar system



Diagnostic steps

1 . Check reverse radar probe

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe
(d) Replacement of new reverse radar probe. (Refer to Chapter 81. Information system - reverse radar, replacement of reverse radar probe)

⚠ **CAUTION**

Replacement of new reverse radar probe shall be of the same size and model of the old reverse radar probe

(e) Ignition Switch: ON.
(f) Place in reverse gear

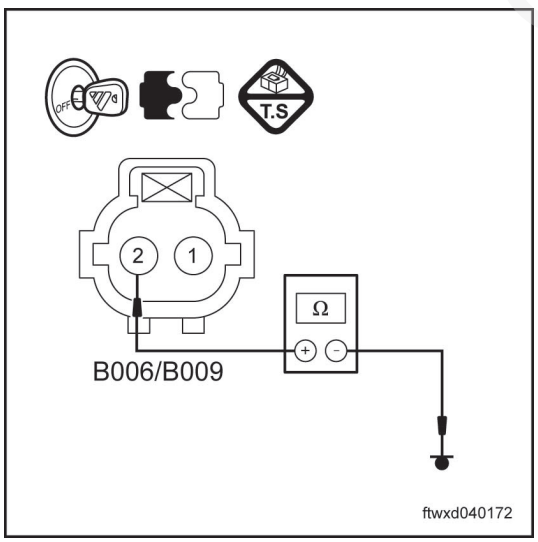
Whether self-checking of the reverse radar is normal or not?

Yes> Replace reverse radar probe.

No> go to step 2

2 . Check harness and connector (reverse radar probe-ground)

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016 (2) ground	⩾1MΩ
C016 (2) ground	

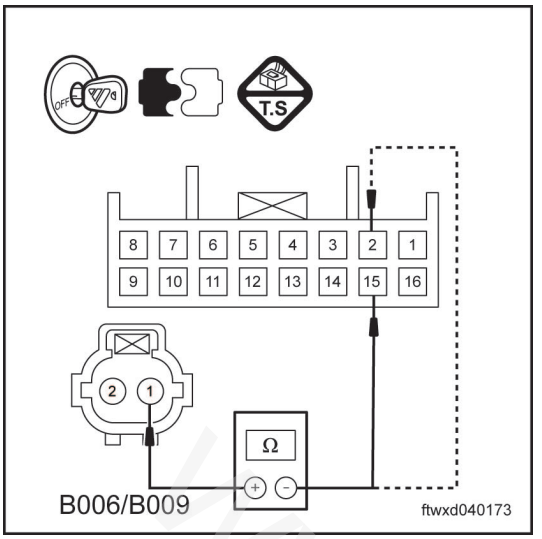
Check whether the result is normal?

Yes> go to step 3

No > Maintenance or replace harness.

3 . Check harness and connector (reverse radar controller-reverse radar probe)

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe
(d) Disconnect connector C015, reverse radar controller



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C015（2） - B006（1）	＜2Ω
C015（15） - B009 （1）	

Check whether the result is normal or not?

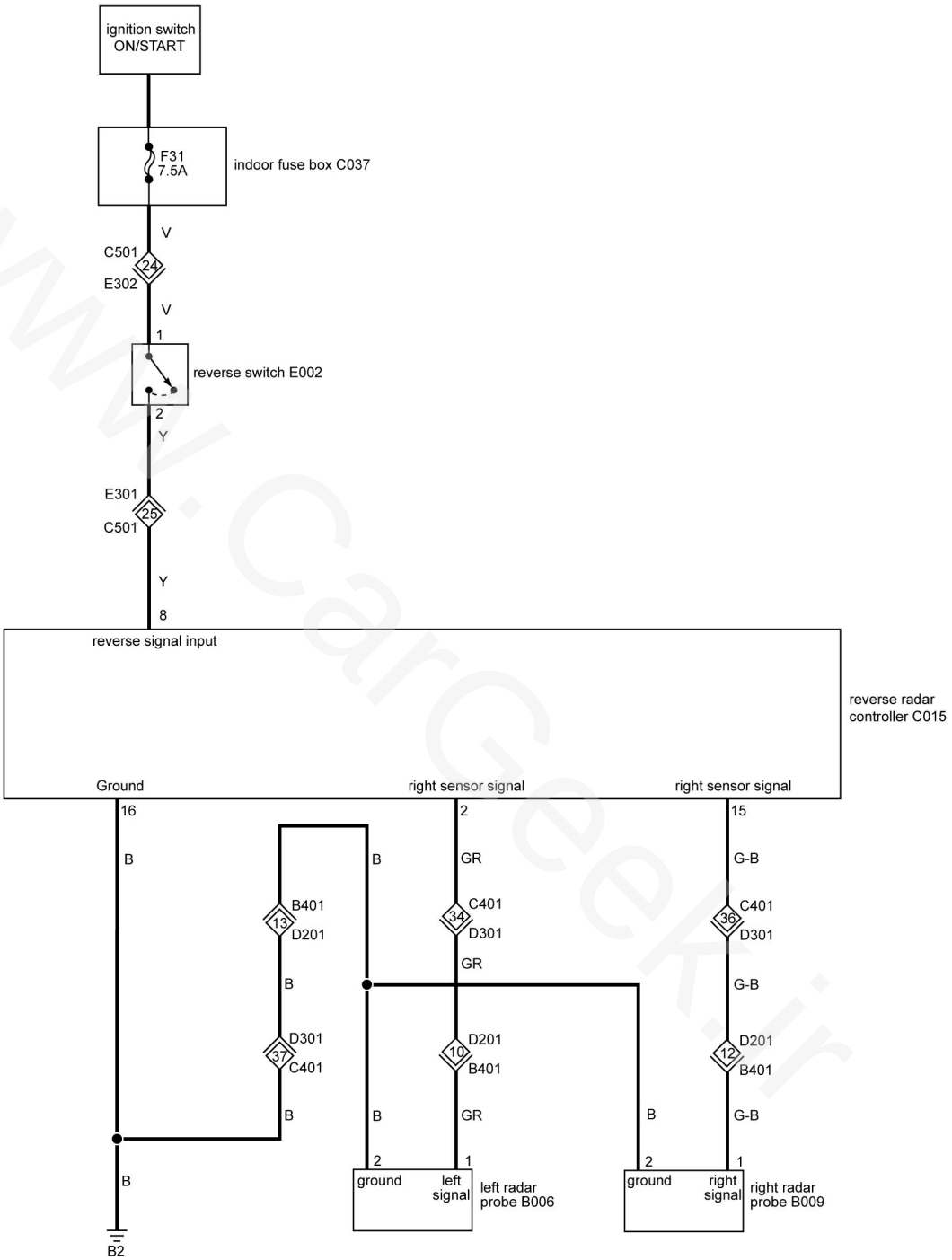
Yes>Replacement (Reverse Radar Controller)

No > Maintenance or replace harness.

BEFORE ENTERING REVERSE GEAR, REVERSE RADAR APPEAR WORKING PHENOMENON

Circuit diagram

reverse radar system

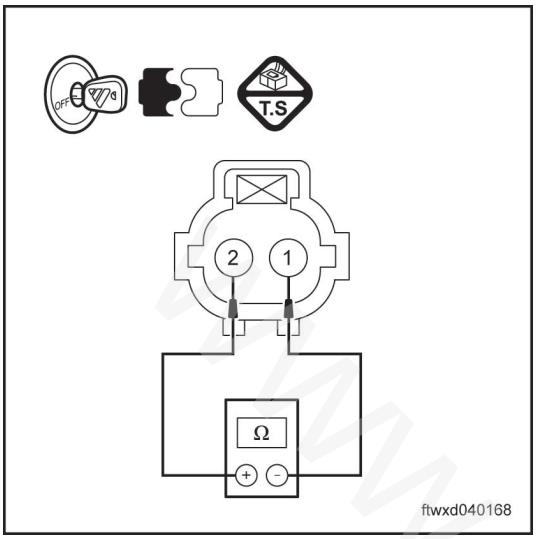


Diagnostic steps

1 . Check reverse lamp switch

(a) Ignition Switch: OFF.

(b) Disconnect reverse lamp switch connector E002.



(c) Check reverse switch

Standard voltage （short circuit or not）

Conditions	Multimeter connection stitch	Specified value
Place in reverse gear	1 - 2	＜2Ω
Retreat from reserve gear	1 - 2	≥1MΩ

Check whether the result is normal?

Yes> go to step 2

No> replace reverse switch

2 . Check reverse radar controller

(a) Ignition Switch: OFF.

(b) Disconnect connector C015, reverse radar controller

(c) Replacement new reverse radar controller. (Refer to Chapter 81. Information system - reverse radar, replacement of reverse radar controller)

⚠ **CAUTION**

Replacement of reverse radar controller needs to select the controller of the same size and model.

Check whether the result is normal or not?

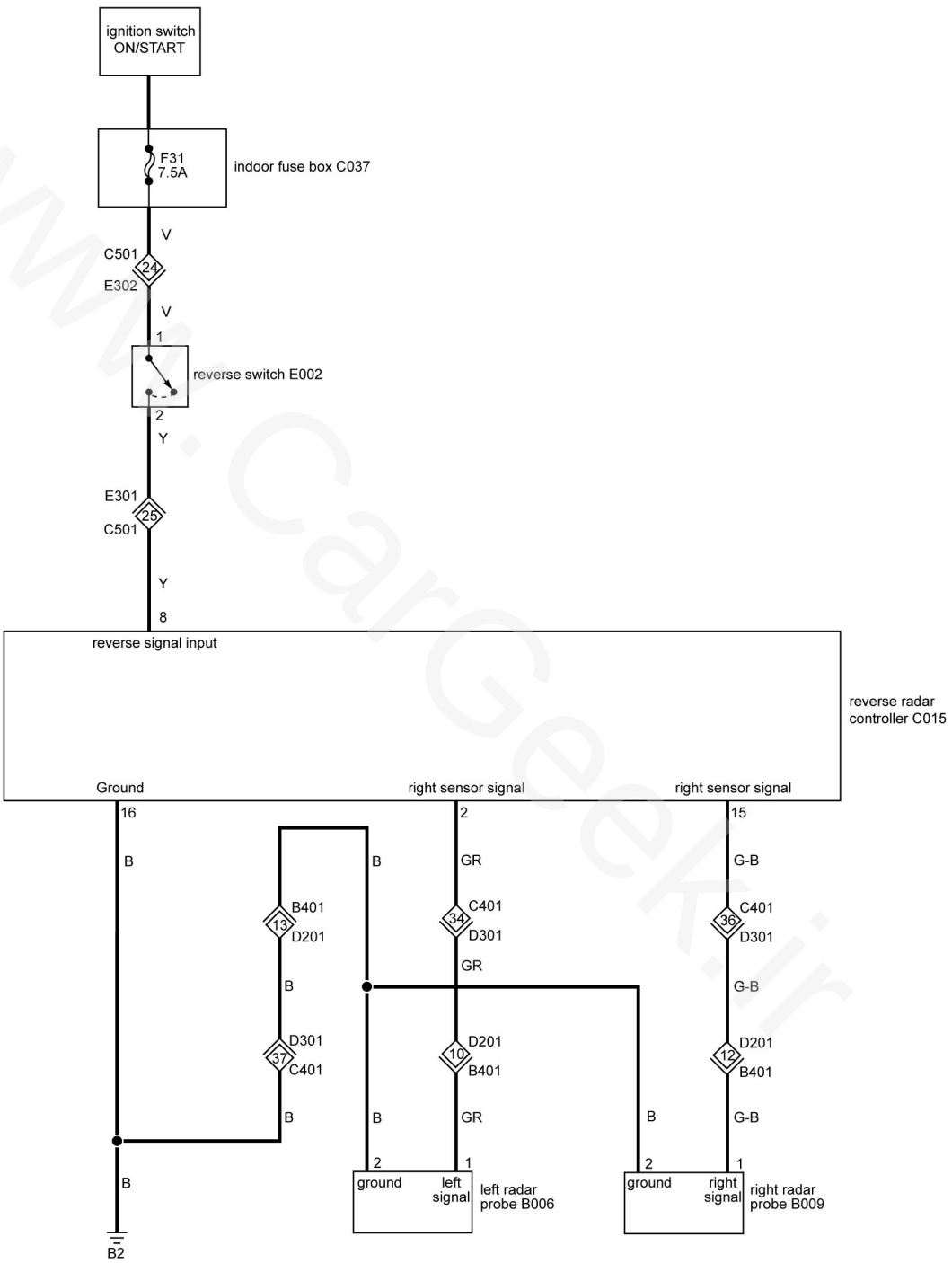
Yes>Replacement (Reverse Radar Controller)

No> Remove defect 29 by other means.

ENTER REVERSE GEAR, AND THE OBSTACLE IS WITHIN THE DISTANCE OF EFFECTIVE SENSE。THE REVERSE RADAR SYSTEM DOESN’T WORK

Circuit diagram

reverse radar system



Diagnostic steps

1 . Check reverse radar probe

(a) Ignition Switch: OFF.
(b) Disconnect connector D001, left reverse radar probe
(c) Replacement of new reverse radar probe. (Refer to Chapter 81. Information system - reverse radar, replacement of reverse radar probe)

⚠ **CAUTION**

Replacement of reverse radar probe needs to select the probe of the same size and model.

(d) Ignition Switch: ON.
(e) Place in reverse gear

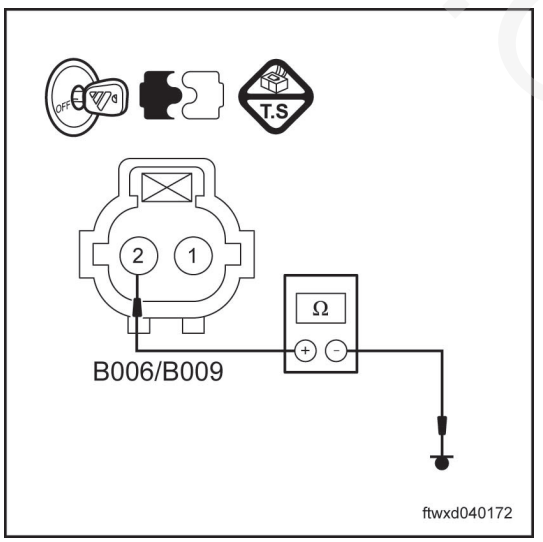
Whether reverse radar is normal or not?

Yes> Replace reverse radar probe.

No> go to step 2

2 . Check harness and connector (reverse radar probe-ground)

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016 (2) ground	＜2Ω
C016 (2) ground	

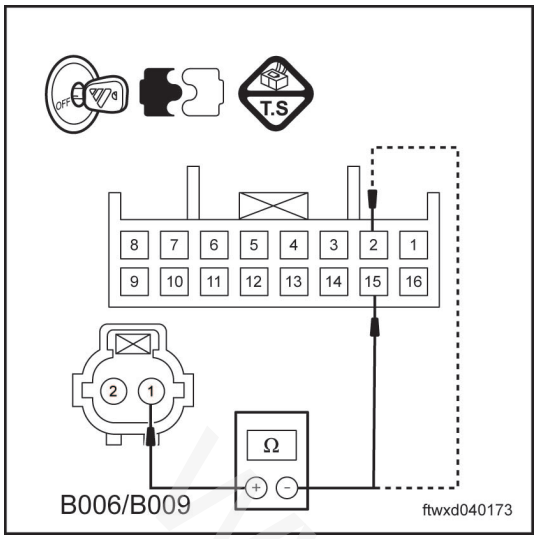
Check whether the result is normal or not?

Yes> go to step 3

No > Maintenance or replace harness.

4 . Check harness and connector (reverse radar controller-reverse radar probe)

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe
(d) Disconnect connector C015, reverse radar controller



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C015（2） - B006（1）	＜2Ω
C015（15） - B009 （1）	

Check whether the result is normal or not?

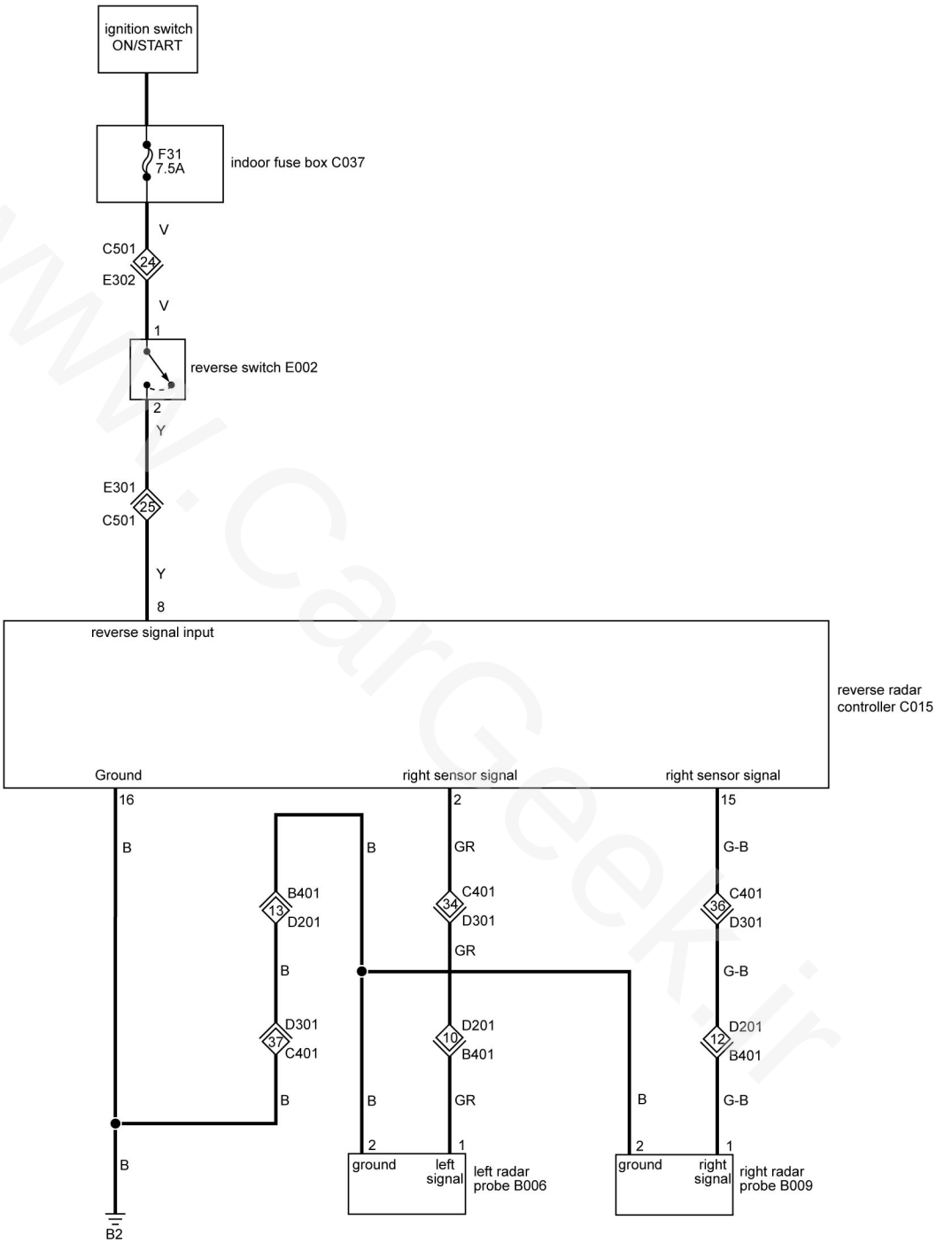
Yes>Replacement (Reverse Radar Controller)

No > Maintenance or replace harness.

ENTER REVERSE GEAR, NO OBSTACLES BEHIND THE VEHICLES WHILE THE REVERSE RADAR SYSTEM IS ABNORMAL

Circuit diagram

reverse radar system



Diagnostic steps

1 . Check the work environment of reverse radar probe

(a) Check whether the surface of the reverse radar probe is covered by the mud or snow and other impurities.
(b) Check whether reverse radar probe is freezed.

Whether the above reasons exist?

Yes> Clean the foreign body on the surface of reverse radar probe or let reverse radar probe work under normal temperature.

No> go to step 2

2 . Check reverse radar probe

(a) Ignition Switch: OFF.
(b) Disconnect connector D001, left reverse radar probe
(c) Disconnect connector B004, right reverse radar probe
(d) Replacement of new reverse radar probe. (Refer to Chapter 81. Information system - reverse radar, replacement of reverse radar probe)

⚠ **CAUTION**

Replacement of the reverse radar probe needs to select the probe of same size and model.

(e) Ignition Switch: ON.
(f) Place in reverse gear

Whether reverse radar is normal or not?

Yes> Replace reverse radar probe.

No> go to step 3

3 . Check reverse radar controller

(a) Ignition Switch: OFF.
(b) Disconnect connector C015, reverse radar controller
(c) Replacement new reverse radar controller. (Refer to Chapter 81. Information system - reverse radar, replacement of reverse radar controller)

⚠ **CAUTION**

Replacement of reverse radar controller needs to select the controller of the same size and model.

Check whether the result is normal or not?

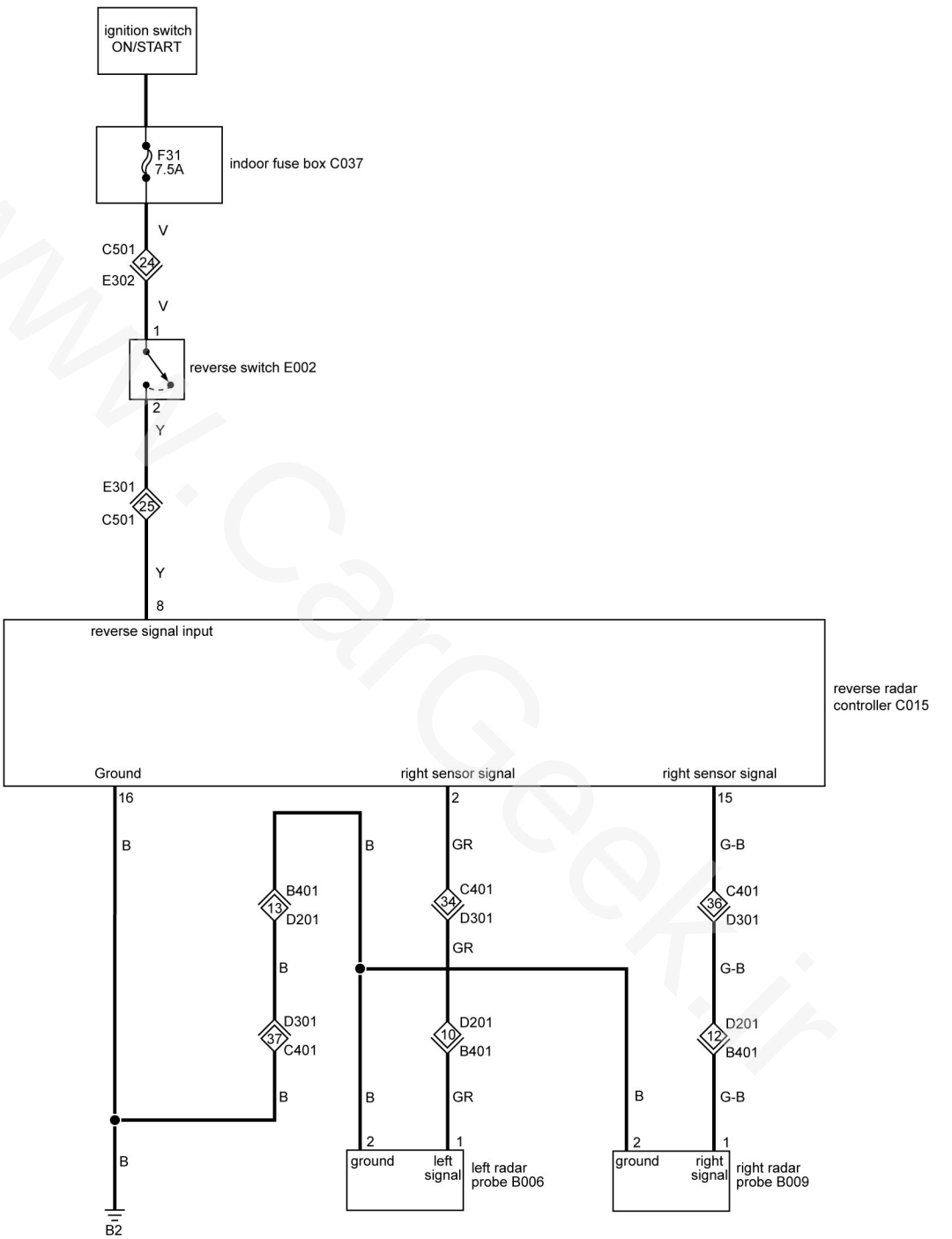
Yes>Replacement (Reverse Radar Controller)

No> Remove the defects by other means.

THE OBSTACLE IS WITHIN THE DISTANCE OF EFFECTIVE SENSE, AND THE BUZZER DOESN’T WORK OR IS ABNORMAL

Circuit diagram

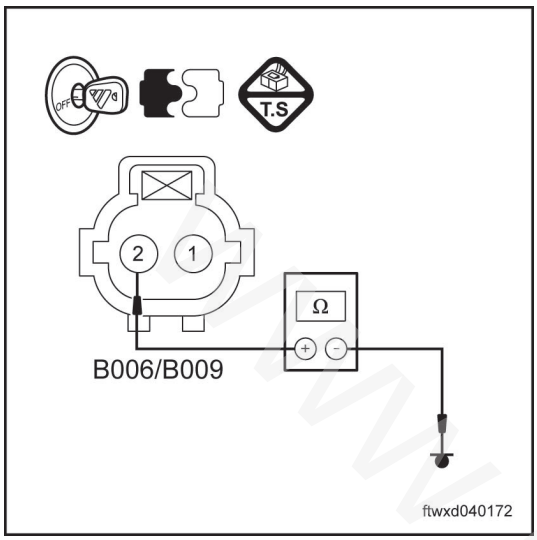
reverse radar system



Diagnostic steps

1 . Check harness and connector (reverse radar probe-ground)

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C016 (2) ground	⩾1MΩ
C016 (2) ground	

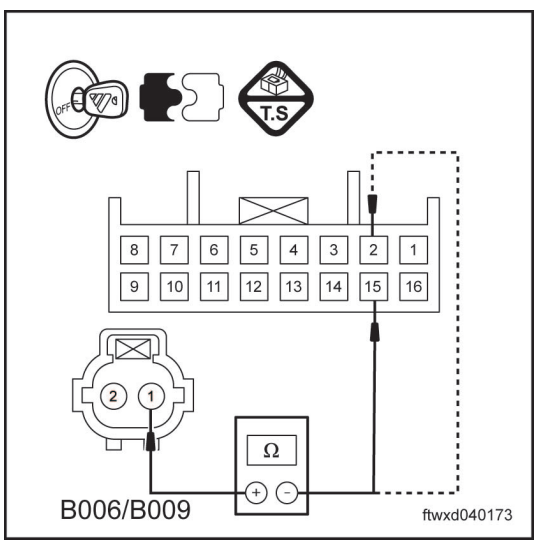
Check whether the result is normal?

Yes> go to step 2

No > Maintenance or replace harness.

3 . Check harness and connector (reverse radar controller-reverse radar probe)

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe
(d) Disconnect connector C015, reverse radar controller



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C015（2） - B006（1）	＜2Ω
C015（15） - B009 （1）	

Check whether the result is normal or not?

Yes> go to step 3

No > Maintenance or replace harness.

5 . Check reverse radar probe

(a) Ignition Switch: OFF.
(b) Disconnect connector B006, left reverse radar probe
(c) Disconnect connector B009, right reverse radar probe
(d) Replace new reverse radar probe. (Refer to Chapter 81. Information system - reverse radar, replacement of reverse radar probe)
(e) Ignition Switch: ON.
(f) Place in reverse gear

Whether reverse radar is normal or not?

Yes> Replace reverse radar probe.

No> Replacement (Reverse Radar Controller)

POWER WINDOW

PRECAUTION

1 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

2 . Disconnect power supply

(a) When disconnecting or installing any electric equipments, or when the tools and equipments are easy to contact exposed electric terminal, the negative（-）cable of the battery must be disconnected firstly so as to prevent people or vehicles from being damaged.

⚠ **CAUTION**

Before disconnecting negative cable of the battery, remember to take away the car keys for fear that the car is locked.

(b) If there is special illustration, ignition switch must be closed.

3 . Disconnect negative(-) cable of the battery which can reset the daily speedometer, clock of the combination instrument to zero.

⚠ **CAUTION**

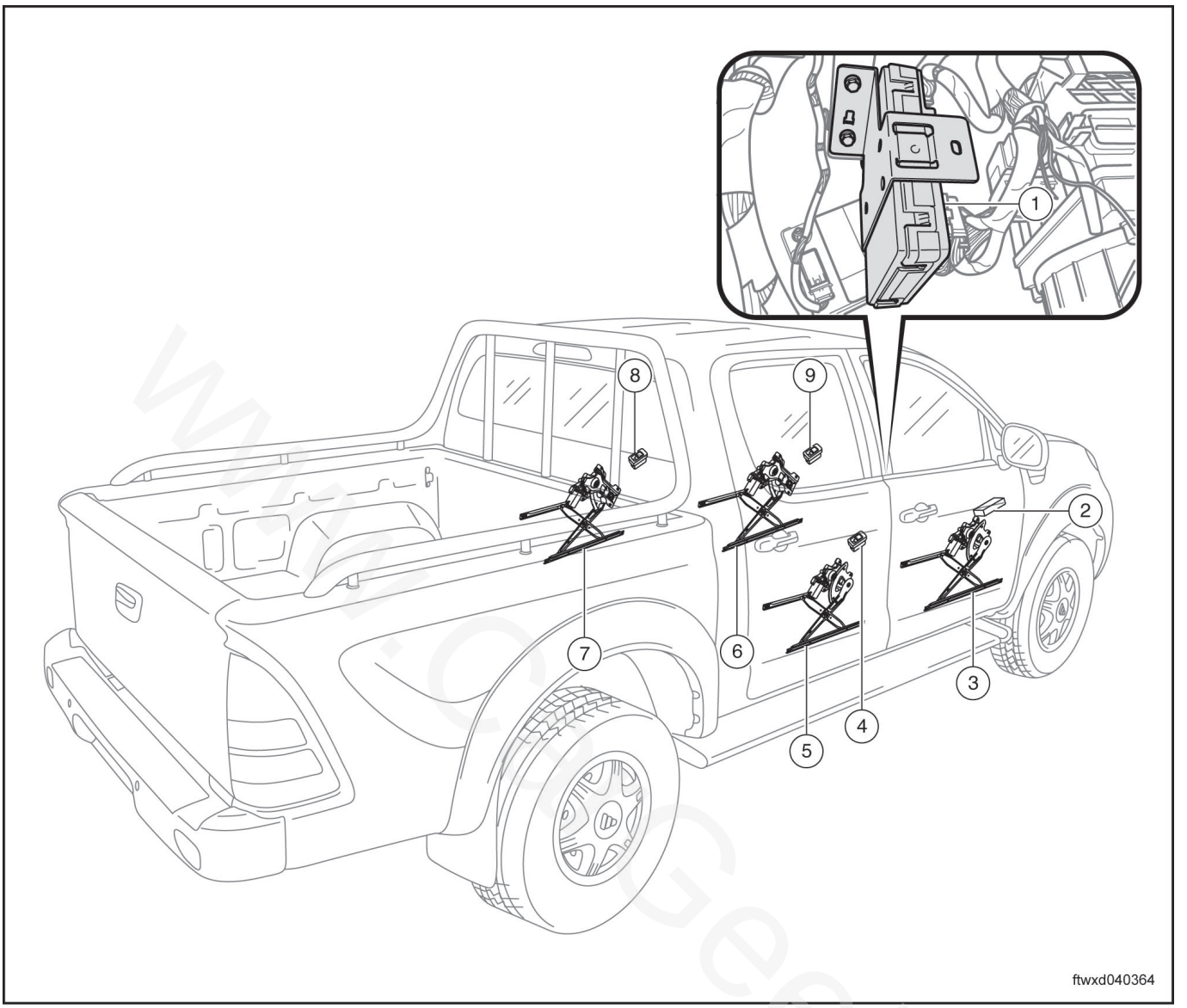
The overall speedometer cannot be reset to zero.

4 . Disconnect negative cable of the battery can make the sound system lose the stored settings.

⚠ **CAUTION**

When reconnecting the negative cable of the battery, the sound system should be reset. (refer to “instruction for use of the sound system (in English)”)

COMPONENTS DRAWING



1	Body Controller
2	Control switch assembly, driver’s door
3	Lifter assembly, right front door
4	Power switch, right rear door
5	Lifter assembly, right rear door

6	Lifter assembly, left front door
7	Lifter assembly, left rear door
8	Power window switch, left rear door
9	Power window switch, assistant driver’s door

BASIC INSPECTION

Steps	Inspection contents		Measures
1	Check Battery voltage • Battery voltage shall not be lower than 12V. Check whether the result is normal?	Yes	No> go to step 2
		No?	Charge or replace the battery. Refer to "Chapter 20A, start and charge--battery"
2	Check the glass lifter of left front door • Ignition Switch: ON. • Use overall control switch of the door to operate the up and down of the lifter at left front door at gear1. Check whether the result is normal?	Yes	No> go to step 3
		No?	Go to defect phenomenon form
3	Check the automobile lowering functions for left front door glass • Ignition Switch: ON. • Ignition Switch: ON. Check whether the result is normal?	Yes	No> go to step 4
		No?	Go to defect phenomenon form
4	Check glass lifter of left front door • Use overall control switch of the door to operate the up and down of the glass lifter at left front door at gear 1. Use overall control switch of the door to operate the up and down of the glass lifter at left front door at gear 1.	Yes	No> go to step 5
		No?	Go to defect phenomenon form
5	Check glass lifter of left front door • Use overall control switch of the door to operate the up and down of the glass lifter at left front door at gear1. Check whether the result is normal?	Yes	No> go to step 6
		No?	Go to defect phenomenon form
6	Check function of automobile window close • Ignition Switch: OFF. • Close all the doors of the vehicle. • Lock the door, and the power window will close automatically in the order of left to right after 2 seconds. Check whether the result is normal?	Yes	No> go to step 7
		No?	Go to defect phenomenon form
7	Check the lock switch of the window • Press down the lock switch on the overall control switch of the door. • Use overall control switch of the door to operate the up and down of the glass lifter at left front door at gear1. Check glass lifter of left front door is work or not.	Yes	Replace overall switch of the door. (Refer to "Chapter 88. Interior & exterior trims - door interior panel, replacement(power window)")
		No?	No> go to step 8

Steps	Inspection contents		Measures
8	Check the lock switch of the window • Press down the lock switch on the overall control switch of the door. • Use overall control switch of the door to operate the up and down of the glass lifter at left front door at gear1. Check glass lifter of left front door is work or not.	Yes	Go to defect phenomenon form
		No?	Replace control switch of the right front door. (Refer to "Chapter 88. Interior & exterior trims - door interior panel, replacement(power window)")

DEFECT PHENOMENON FORM

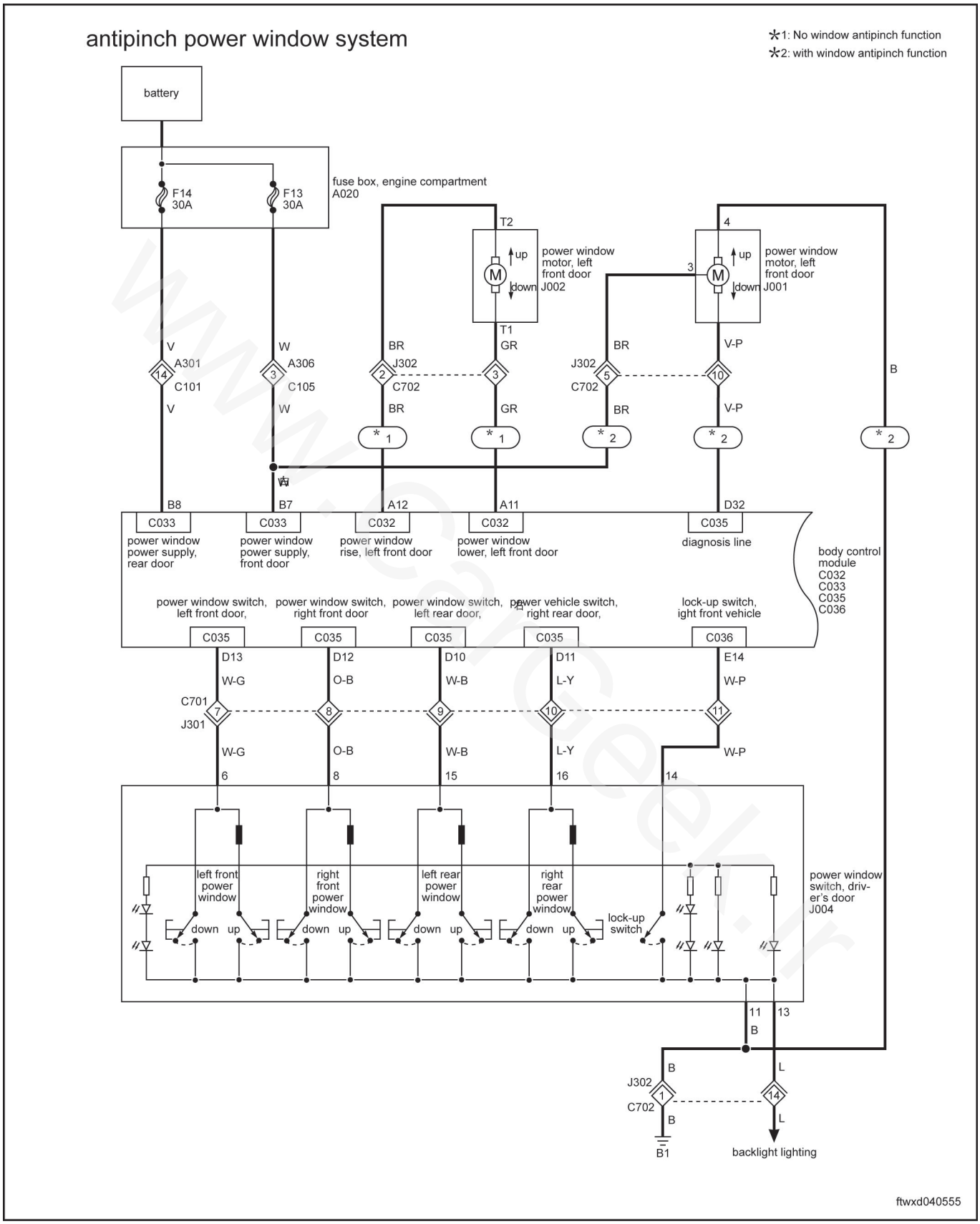
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

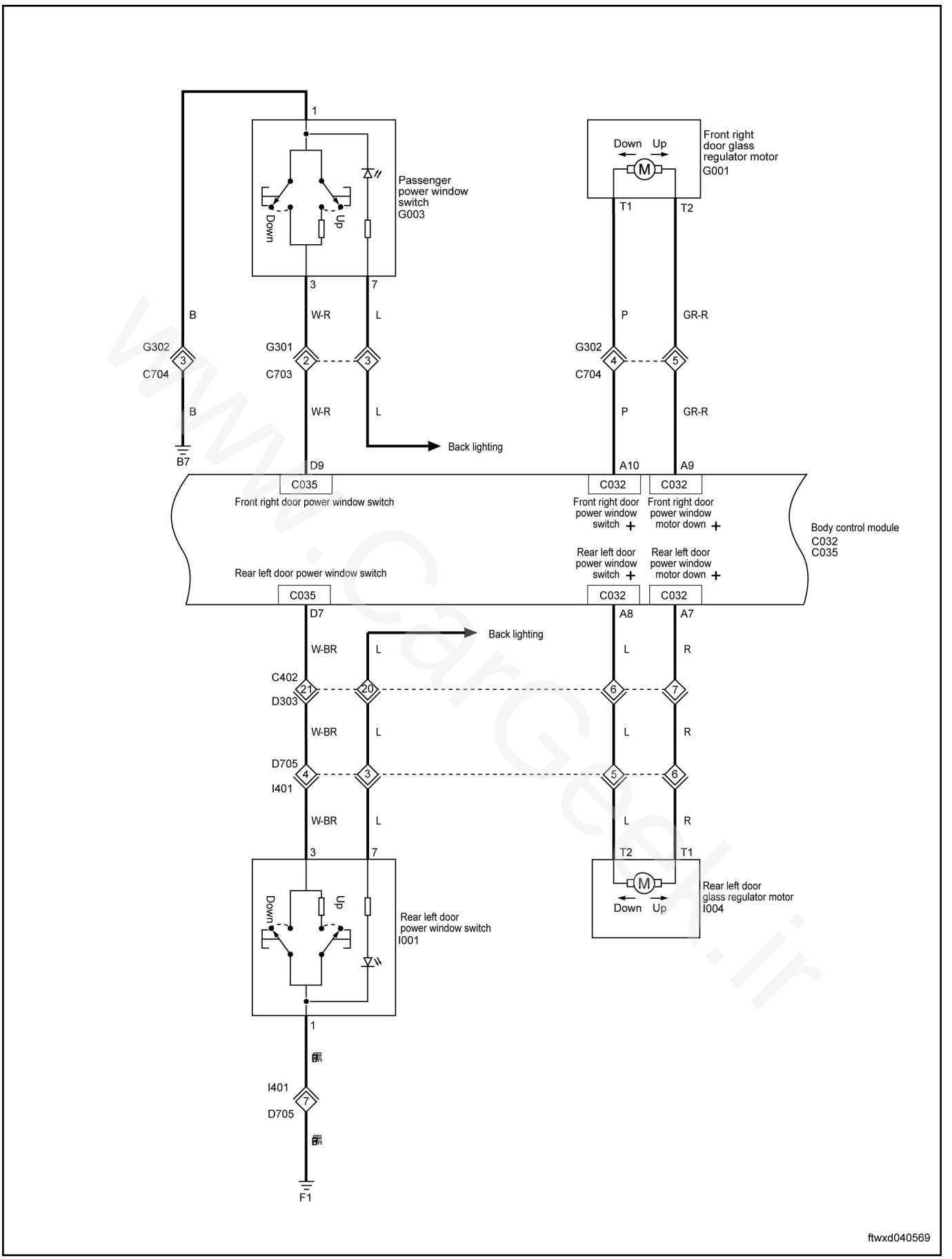
Defect phenomenon	Possible Cause	Reference
B1356 low current of control circuit, right front window rise B1357 The relay of control circuit for right front window rise is stuck at the "NO" location B1359 low current of the control circuit for the right front window lower B 1360 relay of the control circuit for right front window lower is stuck at the "ON" location.	1. Power supply, ground circuit	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	2.Replace overall switch of the door.	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	3.Replace overall switch of the right front door.	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	4.Check glass lifter of right front door	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	5. Harness circuit	—
B1368 low current of control circuit, right front window rise B1369 The relay of control circuit for right back window rise is stuck at the "NO" location B1371 low current of the control circuit for right back window lower B 1372 relay of the control circuit for the lowering of right back window is stuck at the "ON" location.	1. Power supply, ground circuit	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	2.Replace overall switch of the door.	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	3.Replace control switch of the window at right rear door.	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	4.Glass lifter of right rear door	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	5. Harness circuit	—
All the power window stop working	1. Power supply, ground circuit	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	2.Replace overall switch of the door.	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	3. Central control lock controller	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	4.Check glass lifter of left and right front door	Chapter 82. Windscreen/window glass /rearview mirror - power window, replacement
	5. Harness circuit	—

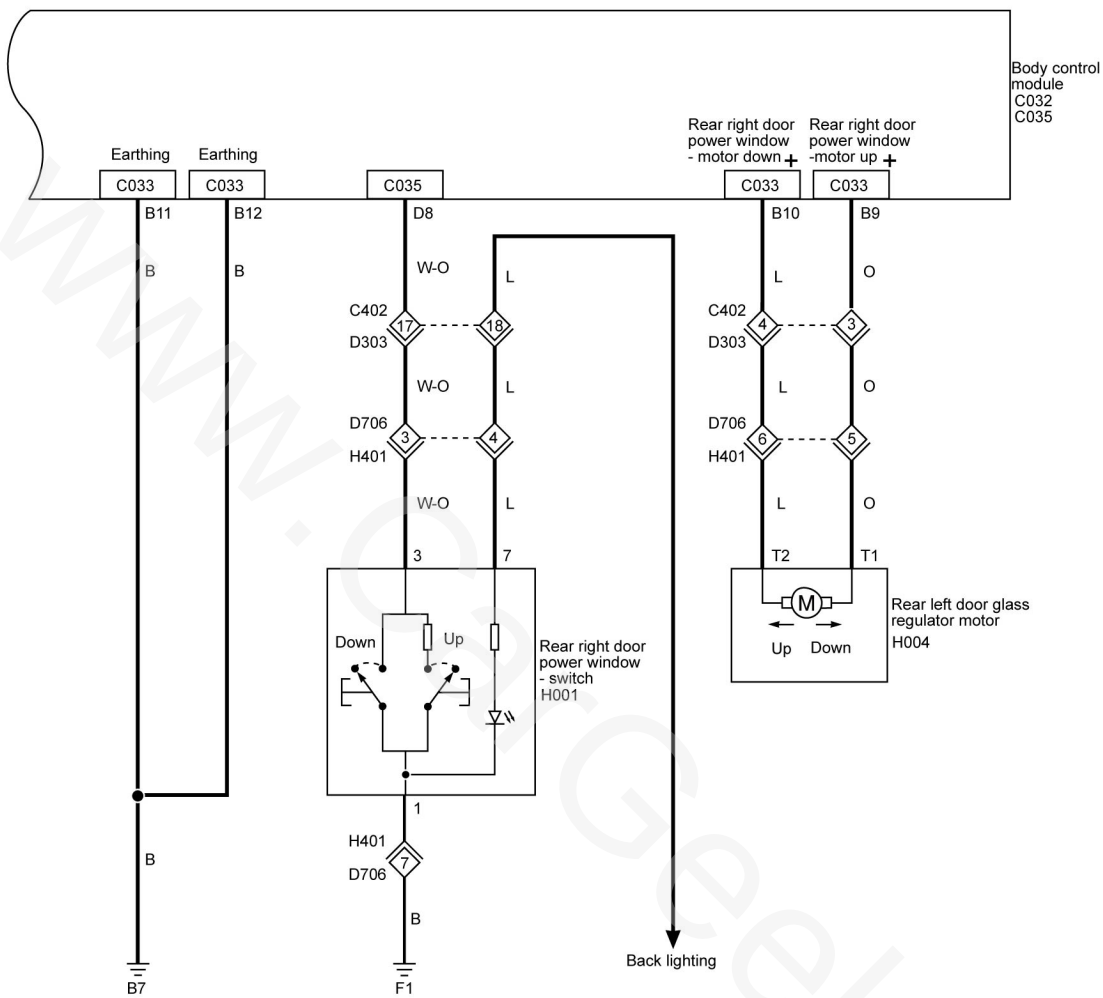
Defect phenomenon	Possible Cause	Reference
B1350 low current of control circuit, left front window rise B1351 The relay of control circuit for left front window rise is stuck at the “NO” location B1353 low current of the control circuit for left front window lower B 1354 relay of the control circuit for the l left front window lower is stuck at the “ON” location.	1. Power supply, ground circuit	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	2.Replace overall switch of the door.	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	3.Replace overall switch of the left front door.	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	4.Glass lifter of left front door	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	5. Harness circuit	—
B1362 low current of control circuit, left back window rise B1363 The relay of control circuit for left rear window rise is stuck at the “NO” location B1365 low current of the control circuit for left back window lower B 1354 relay of the control circuit for the left rear window lower is stuck at the “ON” Location.	1. Power supply, ground circuit	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	2.Replace overall switch of the door.	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	3. Window control switch, left rear door	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	4.Glass lifter of left rear door	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
	5. Harness circuit	—

ALL THE POWER WINDOW STOP WORKING

Circuit diagram





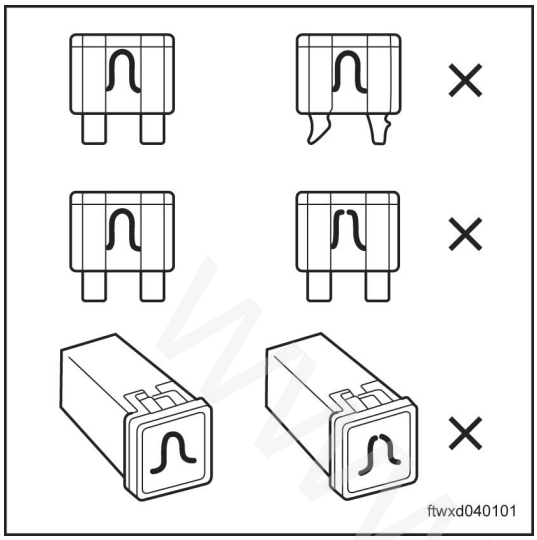


ftwxd040570

Diagnostic steps

1 . Check power supply fuse of power window

(a) Ignition Switch: OFF.



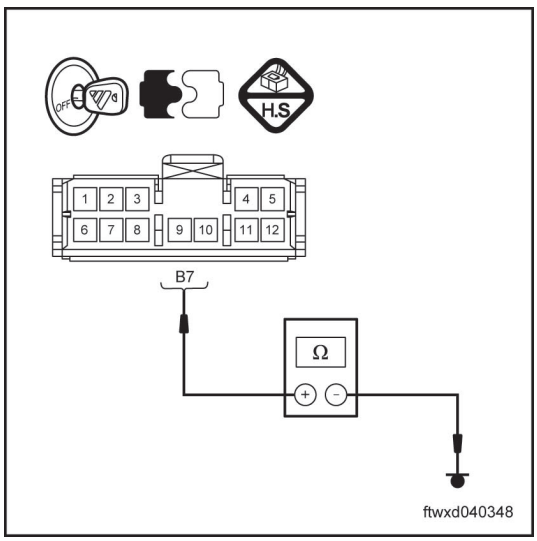
(b) Check fuse of fuse box, engine room: F13 (30A), F14 (30A)

Check whether the fuse is good or not?

Yes> go to step 2

No> replace fuse

2 . Check fuse: the control circuit from F13 (30A) to body



(a) Use multimeter to measure the resistance between No.B7 stitch of connector C033 of the body and the ground.

Standard resistance (check whether there is short circuit)

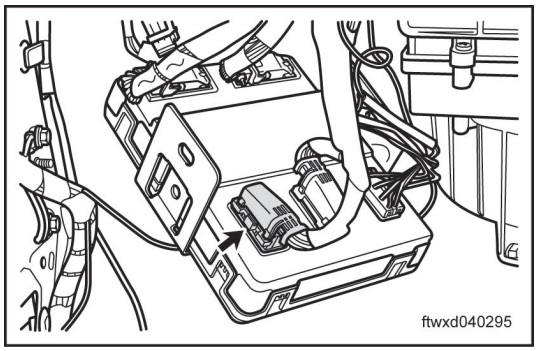
Multimeter connection	Standard value
C033 (B7) ground	⩾ 1 MΩ

Check whether the fuse is good or not?

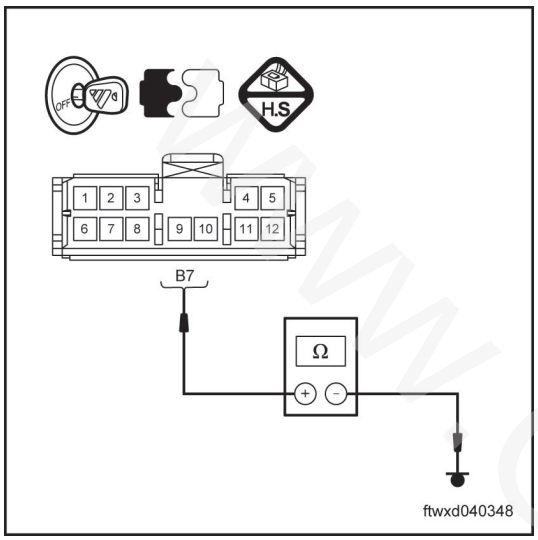
Yes> Replace fuse: F13 (30A).

No> go to step 3

3 . Check fuse: the control circuit from F13 (30A) to body



(a) Disconnect connector C033, body controller.



(b) Use multimeter to measure the resistance between No.B7 stitch of connector C033 of the body and the ground.

Standard resistance (check whether there is short circuit)

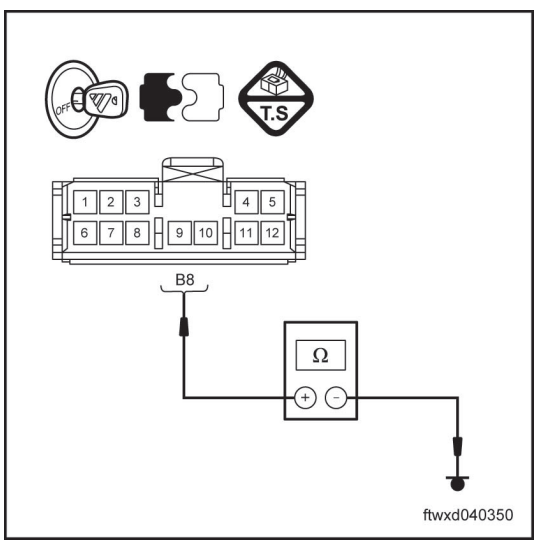
Multimeter connection	Standard value
C033 (B7) ground	⩾ 1 MΩ

Check whether the result is normal?

Yes> replace body controller

No> replace fuse: F13 (30A), repair to-ground short circuit between fuse F13(30A) and No.B8 stitch of connector C033 of body controller

4 . Check power supply circuit of body controller



(a) Use multimeter to measure the resistance between No.B78 stitch of connector C033 of body controller and the ground.

Standard resistance (check whether there is short circuit)

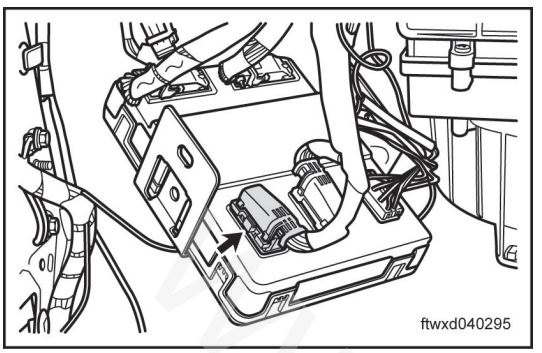
Multimeter connection	Standard value
C033 (B8) ground	⩾ 1 MΩ

Check whether the result is normal?

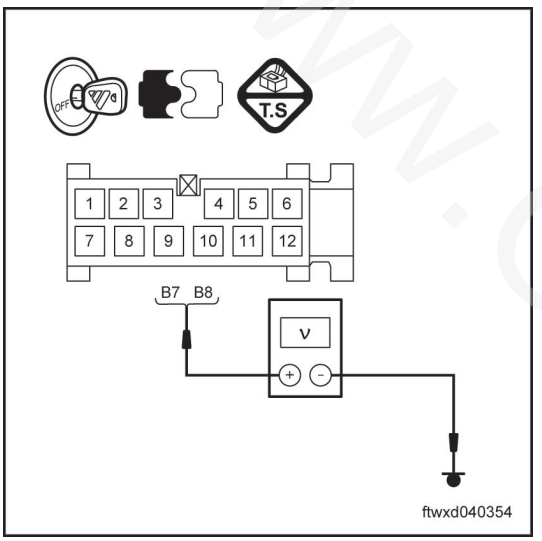
Yes> go to step 5

No> replace fuse: F14 (30A), repair to-ground short circuit between fuse F14 (30A) and pin B8 of connector C033 of body controller

5 . Check power supply circuit of body controller



(a) Disconnect connector C033, body controller.



(b) Use multimeter to measure the voltage between stitches B7 and B8 of connector C033 of body controller and ground.

Standard voltage

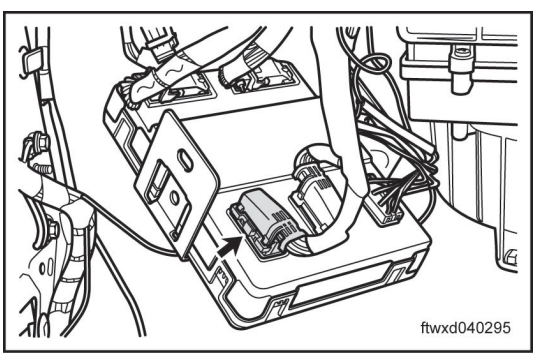
Multimeter connection	Standard value
C033 (B7) ground	Battery voltage
C033 (B8) ground	Battery voltage

Check whether the result is normal?

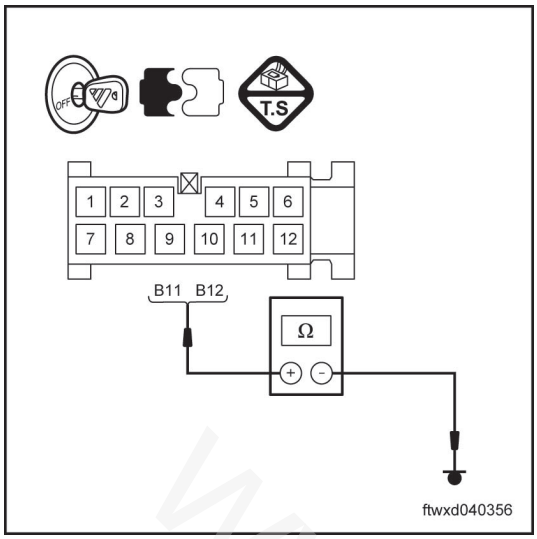
Yes> go to step 6

No> Repair the open circuit between fuse F13 (30A), F14 (30A) and the stitches B7, B8 of connector C033 of the body controller.

6 . Check ground circuit of body controller



(a) Disconnect connector C033, body controller.



(b) Use multimeter to measure the resistance between stitches B11, B12 of connector C033 of the body controller and ground.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C033 (B11) ground	< 2 Ω
C033 (B12) ground	< 2 Ω

04

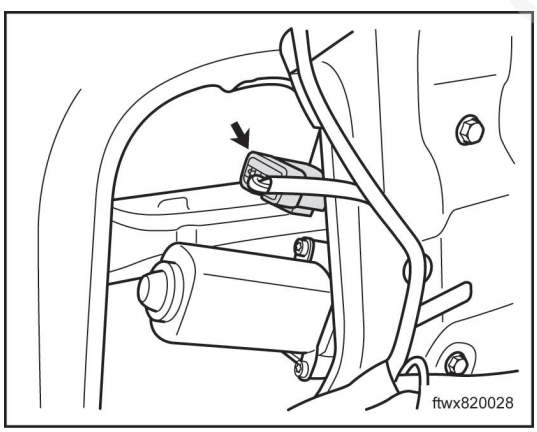
Check whether the result is normal?

Yes> go to step 7

No> Repair the open circuit between stitches B11, B12 of connector C033 of the body controller and ground

7 . Check assembly circuit of power lifter

(a) Ignition Switch: OFF.

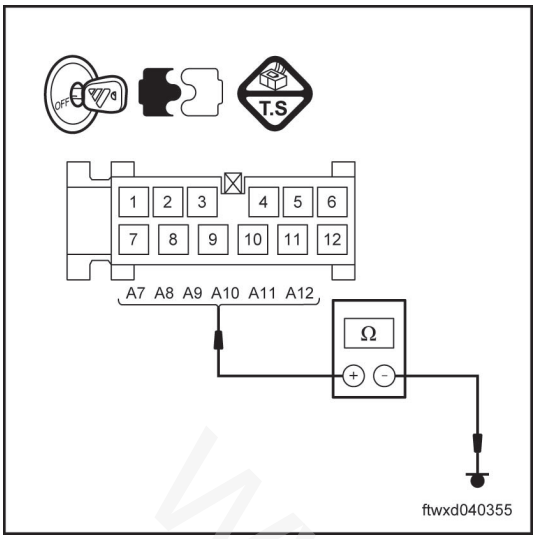


(b) Disconnect motor connector J002, left front power window

(c) Disconnect motor connector I004, left rear power window

(d) Disconnect motor connector G001, right front power window

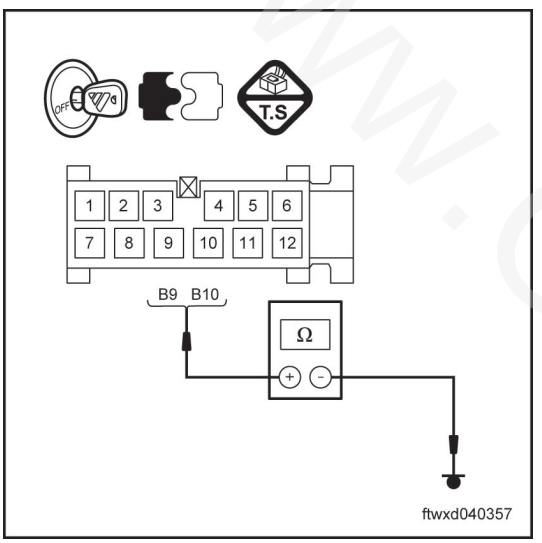
(e) Disconnect motor connector H004, left rear power window



(f) Use multimeter to measure the resistance between stitches A7, A8, A9, A10, A11, A12 of connector C033 of body controller and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C032 (A7) ground	< 2 Ω
C032(A8) ground	< 2 Ω
C032 (A9) ground	< 2 Ω
C032 (A10) ground	< 2 Ω
C032 (A12) ground	< 2 Ω
C032 (A11) ground	< 2 Ω



(g) Use multimeter to measure the resistance between stitches B9 and B10 of connector C033 of body controller and the ground.

Standard resistance (check whether there is short circuit)

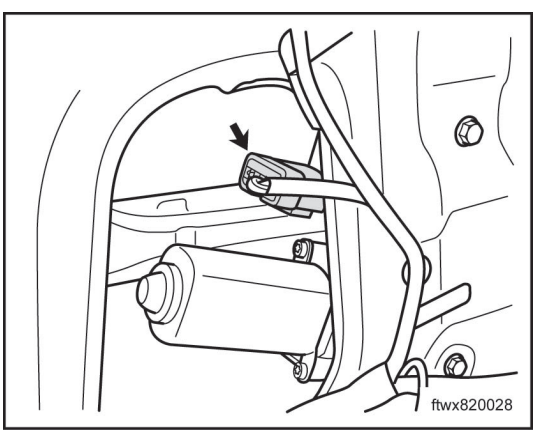
Multimeter connection	Standard value
C033 (B9) ground	< 2 Ω
C033 (B10) ground	< 2 Ω

Check whether the result is normal?

Yes> go to step 8

No> Repair the to-ground circuit from body controller to the power window motor.

8 . Check assembly circuit of power lifter



(a) Disconnect the connector of power window motor.

(b) Connect the positive (+) of the battery and stitch TI of the connector of power lifter assembly, and connect negative (-) of the battery and stitch T2 of the connector of power lifter assembly. Power lifter assembly should move up.

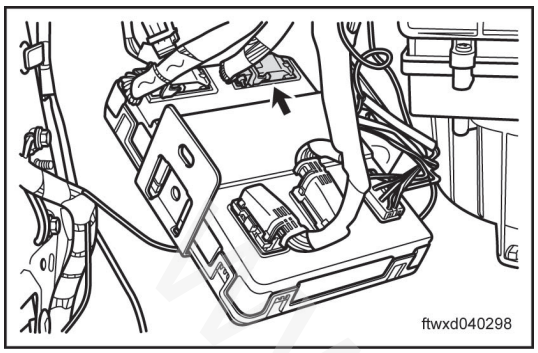
(c) Connect the positive (+) of the battery and stitch TI of the connector of power lifter assembly, and connect negative (-) of the battery and stitch T2 of the connector of power lifter assembly. Power lifter assembly should move down.

Check whether the result is normal?

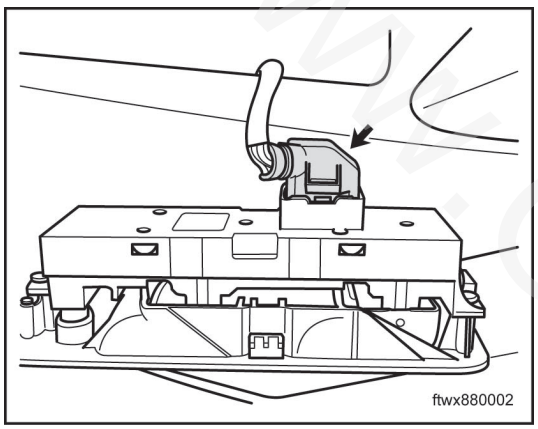
Yes> go to step 9

No> replace power lifter assembly.

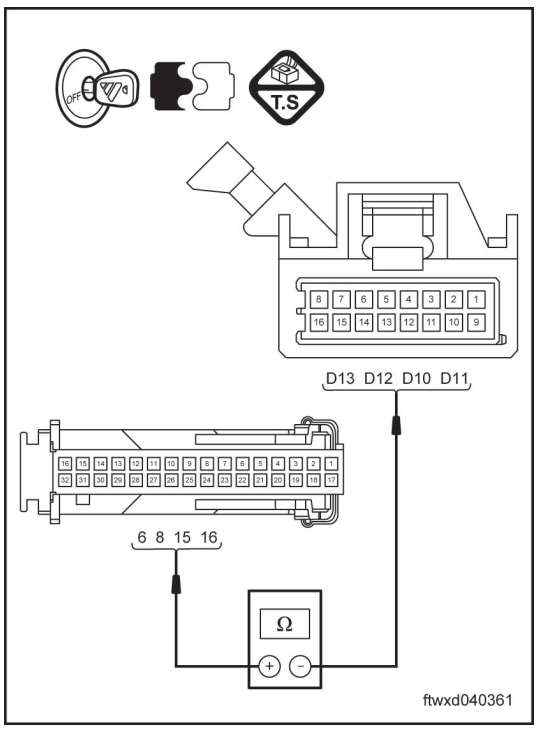
9 . Check short circuit of power supply switch of power window switch, driver’s door



(a) Disconnect connector C035, body controller.



(b) Disconnect connector J004, power window switch , driver’s door.



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
J004 (6) - C035(D13)	＜2 Ω
J004 (8) - C035(D12)	＜2 Ω
J004 (15) - C035(D10)	＜2 Ω
J004 (16) - C035(D11)	＜2 Ω

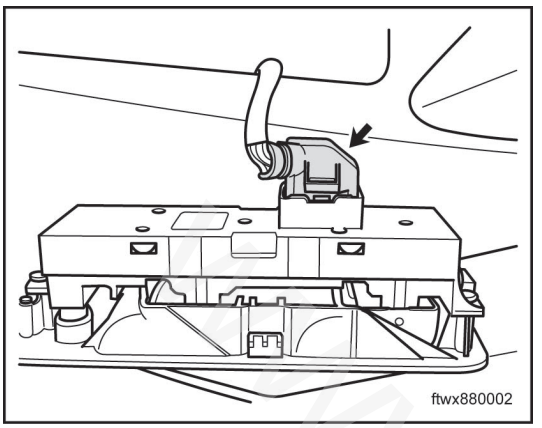
Check whether the result is normal?

Yes> go to step 10

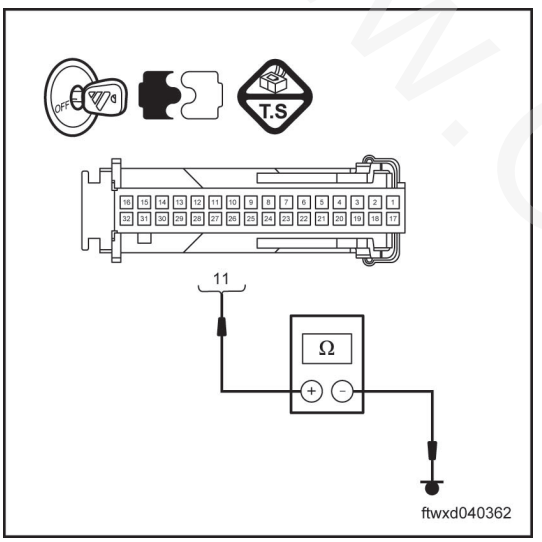
No > Maintenance or replace harness.

10 . Check ground circuit, power window, switch driver’s door

(a) Ignition Switch: OFF.



(b) Disconnect connector J004 of power window switch, driver’s door.



(c) Use multimeter to measure the resistance between stitch 11 of connector J004 of the power window switch of driver’s door and the ground.

Standard electrical resistance (check whether there existent an open circuit)

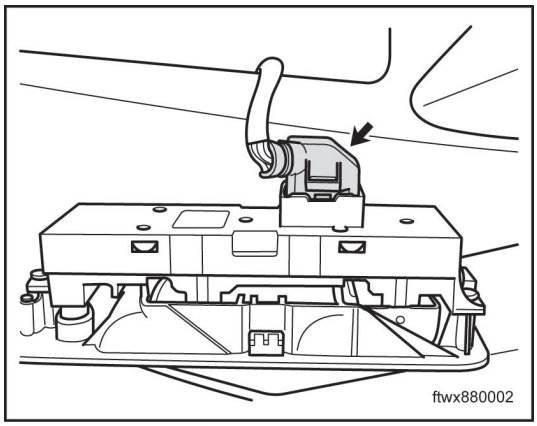
Multimeter connection	Standard value
C040 (11) ground	⩽ 2 Ω

Check whether the result is normal?

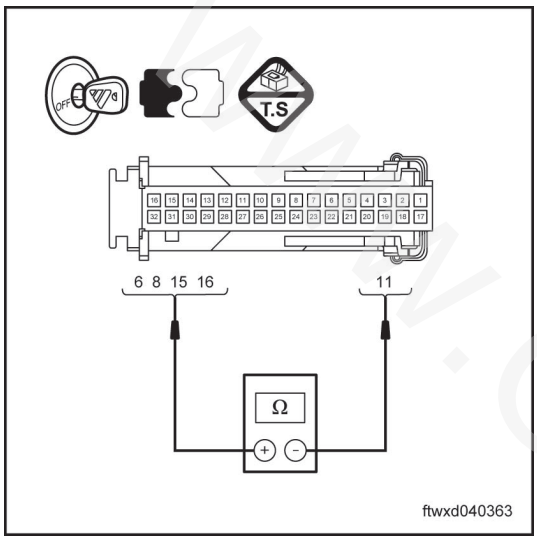
Yes> go to step 11

No> Repair the open circuit between stitch 11of connector J004 of power window switch, driver’s door and ground.

11 . Check power window switch, driver’s door



(a) Disconnect connector J004 of power window switch, driver’s door.



(b) Use a multmeter to measure power window switch, driver’s door.

Multimeter connection	Conditions	Standard value
J004 (6) - J004 (11)	Left front power window rise	About1.2 kΩ
J004 (6) - J004 (11)	Left front power window lower	⩽ 2 Ω
J004 (8) - J004 (11)	Left front power window rise	About1.2 kΩ
J004 (8) - J004 (11)	Right front power window lower	⩽ 2 Ω
J004 (15) - J004 (11)	Left rear power window rise	About1.2 kΩ
J004 (15) - J004 (11)	Left rear power window lower	⩽ 2 Ω
J004 (16) - J004 (11)	Left rear power window rise	About1.2 kΩ
J004 (16) - J004 (11)	Right rear power window lower	⩽ 2 Ω

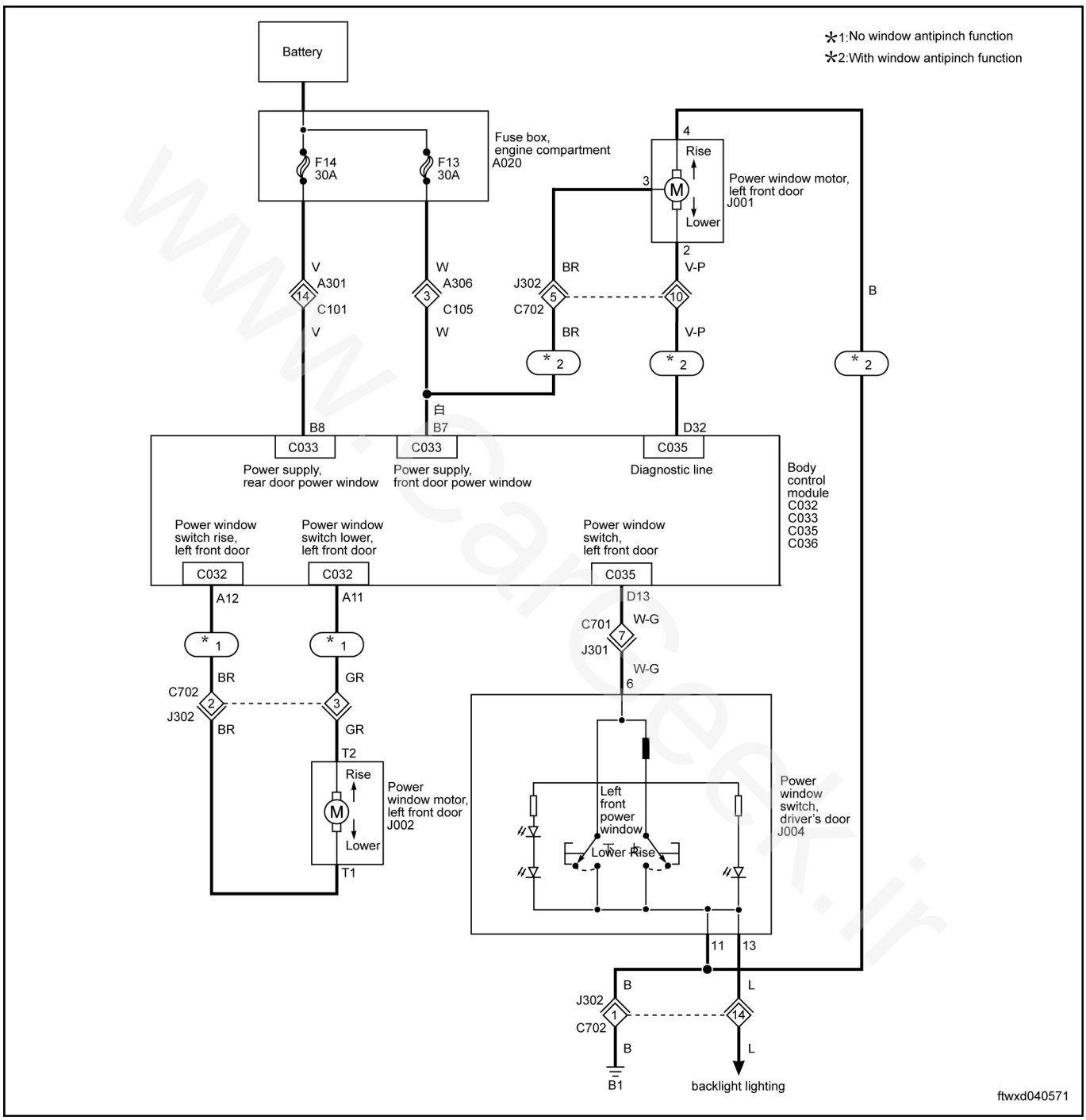
Check whether the result is normal?

Yes> replace body controller

No> Replace power window switch, driver’s door.

B1350 B1353 LOW CURRENT OF CONTROL CIRCUIT, LEFT FRONT WINDOW RISE
B1351 B1354 CONTROL CIRCUIT RELAY OF LEFT FRONT WINDOW IS STUCK AT ON LOCATION

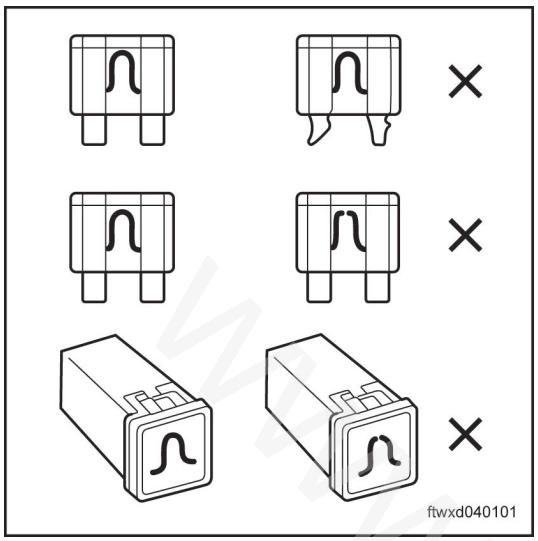
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.



(b) Check fuse inside fuse box, engine compartment : F13 (30A).

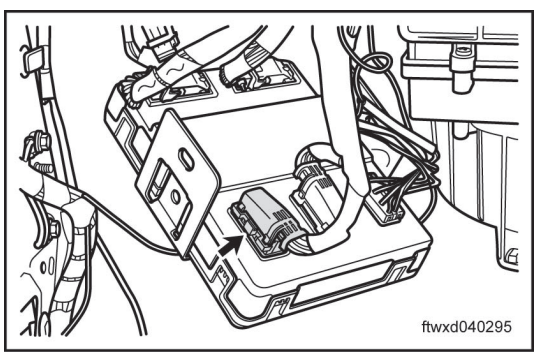
Check whether the result is normal?

Yes> go to step 2

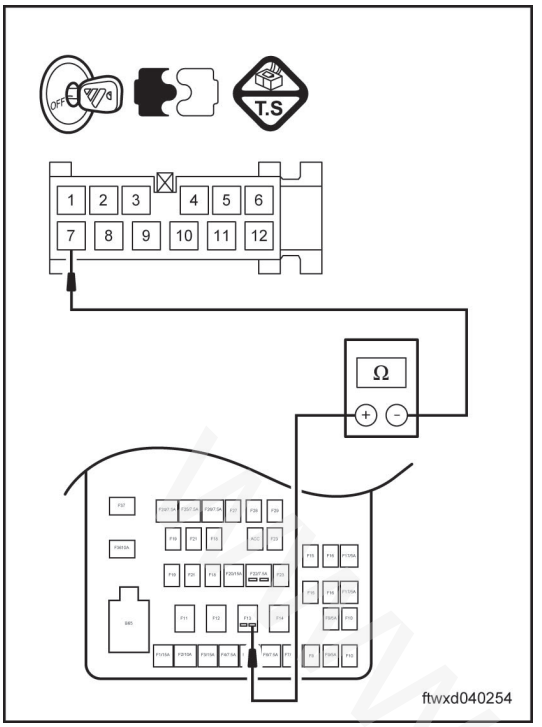
No> replace fuse

2 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect connector C033 , BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F13（30A） - C033（B7）	＜ 2 Ω

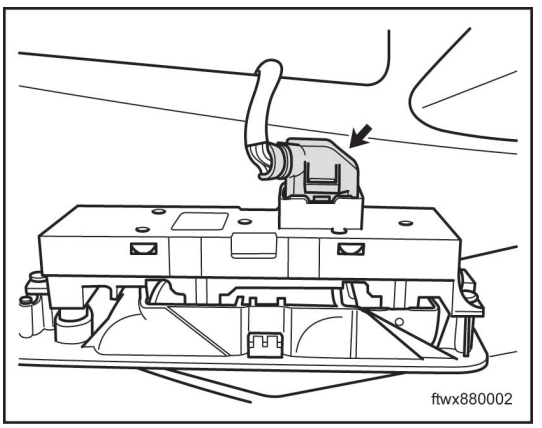
Check whether the result is normal?

Yes> go to step 3

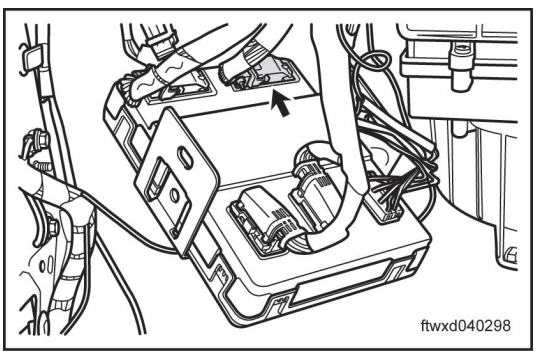
No > Maintenance or replace harness.

3 . Check harness and connector (power window switch, driver’s door-BCM control unit)

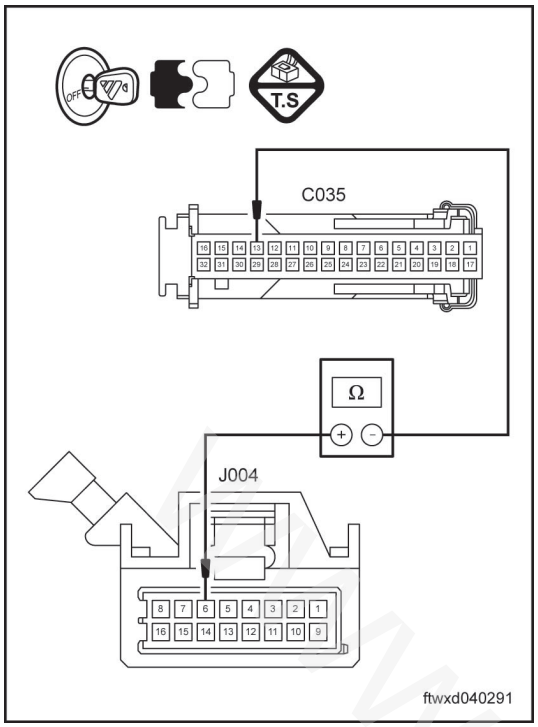
(a) Ignition Switch: OFF.



(b) Pull out power window switch J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
J004（6） - C035（D13）	＜ 2 Ω

04

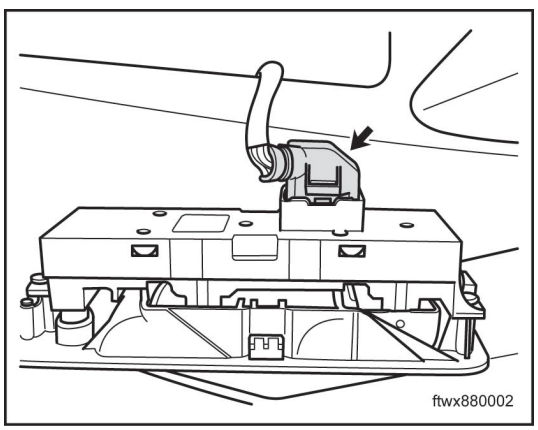
Check whether the result is normal?

Yes> go to step 4

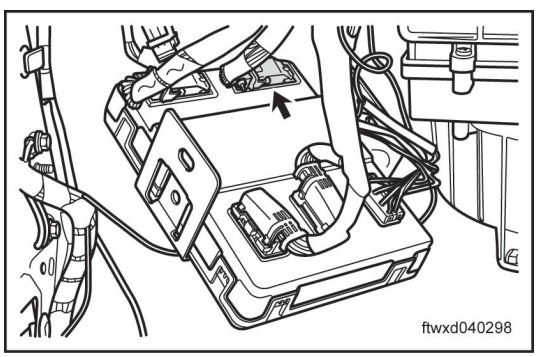
No > Maintenance or replace harness.

4 . Check harness and connector (power window switch, driver’s door-ground)

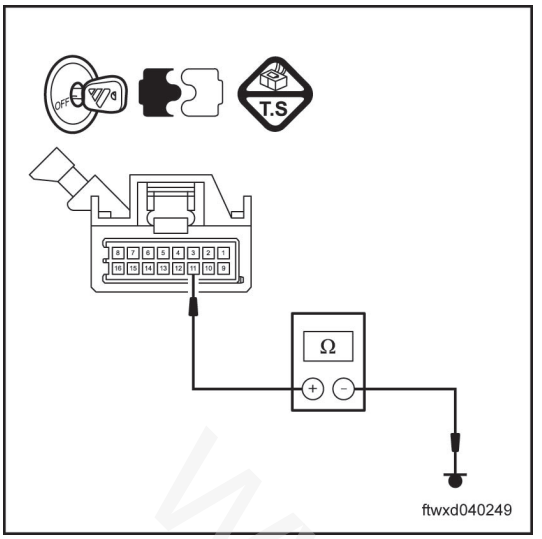
(a) Ignition Switch: OFF.



(b) Pull out Power window switch connector J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
J040 (11) ground	＜ 2 Ω

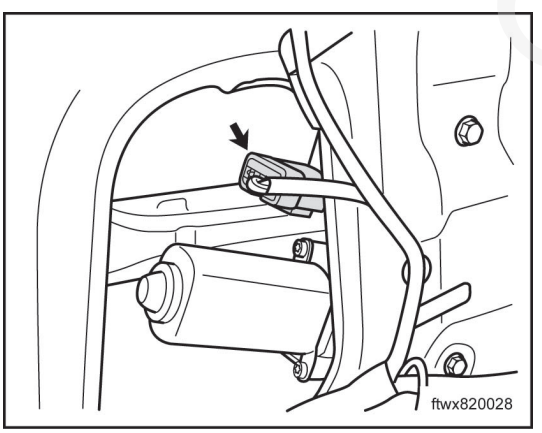
Check whether the result is normal?

Yes> Replace power window switch, driver’ s door.

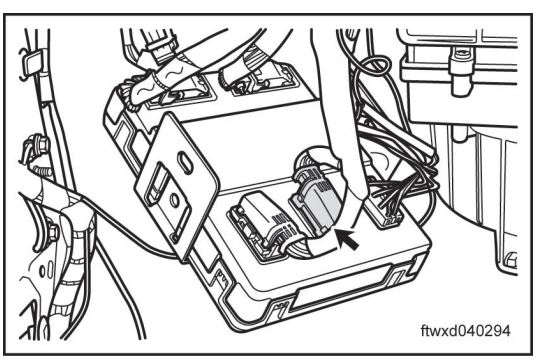
No > Maintenance or replace harness.

5 . Check harness and connector (power window motor, driver’ s door-BCM control unit)

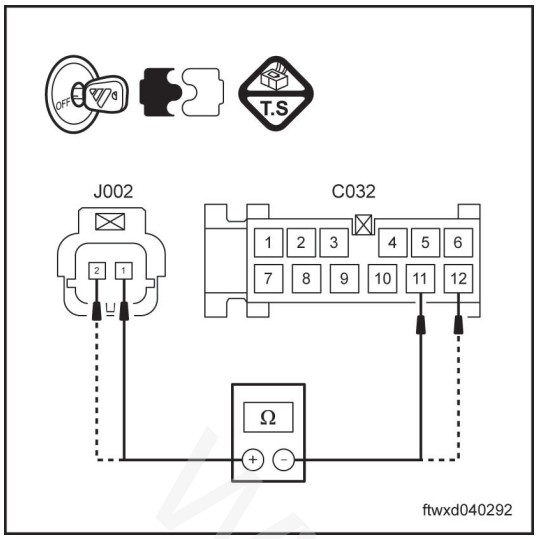
(a) Ignition Switch: OFF.



(b) Pull out power window motor J002, driver’ s door



(c) Disconnect connector C032, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Multimeter connection	Standard value
J002（T2） - C032（A12）	＜2 Ω
J002（T1） - C032（A11）	

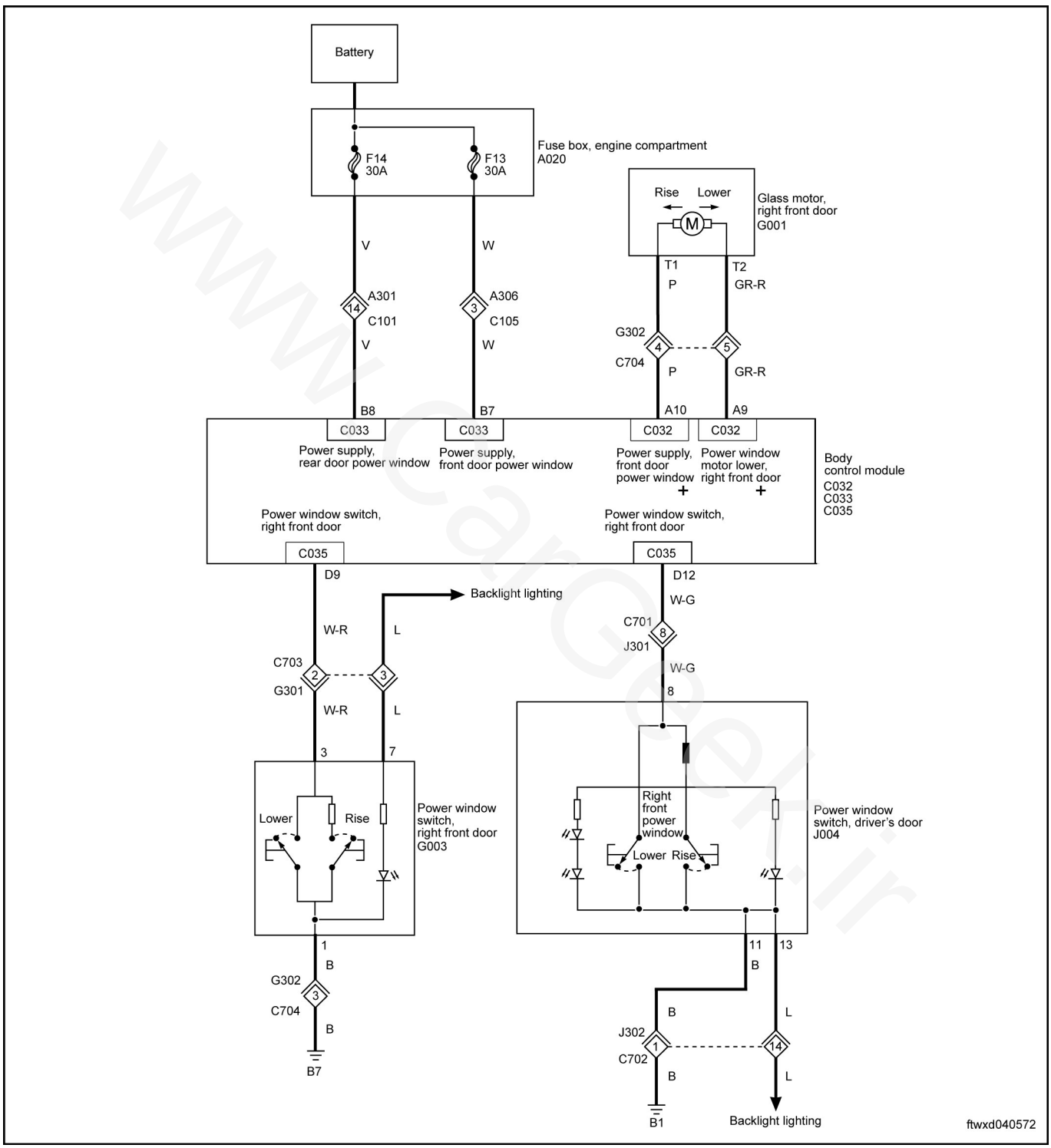
Check whether the result is normal?

Yes> Replace power window motor, driver’ s door.

No > Maintenance or replace harness.

B1356 B1359 LOW CURRENT OF CONTROL CIRCUIT, LEFT FRONT WINDOW RISE
B1357 B1360 CONTROL CIRCUIT RELAY OF LEFT FRONT WINDOW IS STUCK AT ON LOCATION

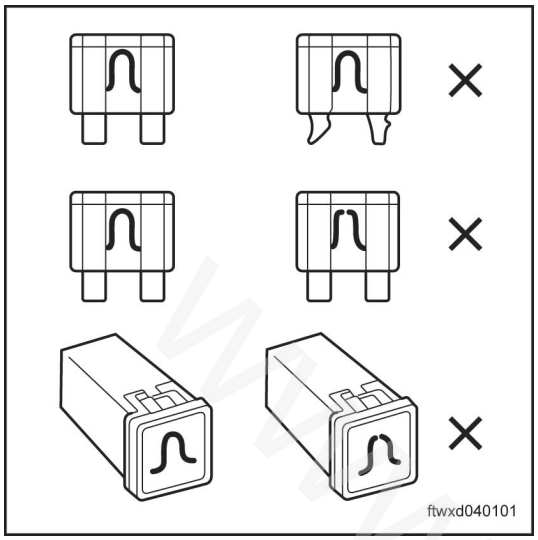
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.



(b) Check fuse inside fuse box, engine compartment : F13 (30 A).

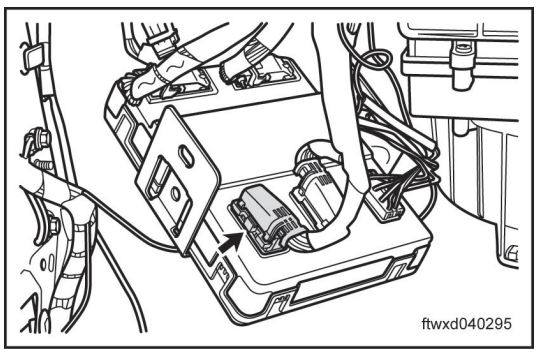
Check whether the result is normal?

Yes> go to step 2

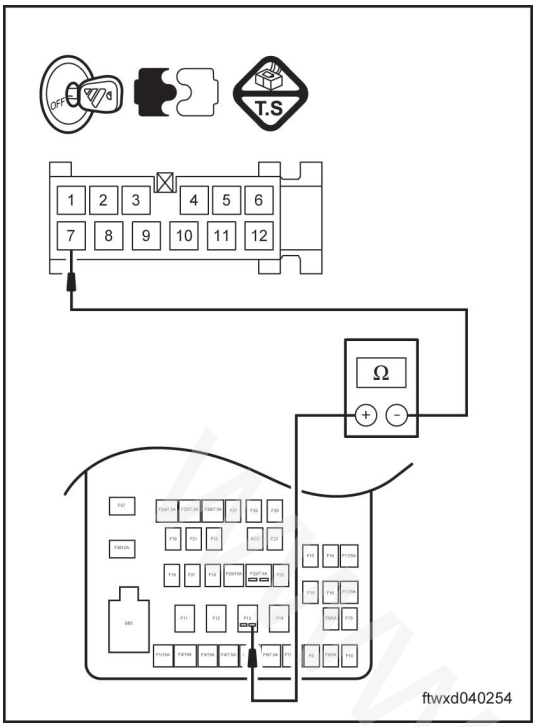
No> replace fuse

2 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect connector C033 , BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F13(30A)-C033（B7）	＜ 2 Ω

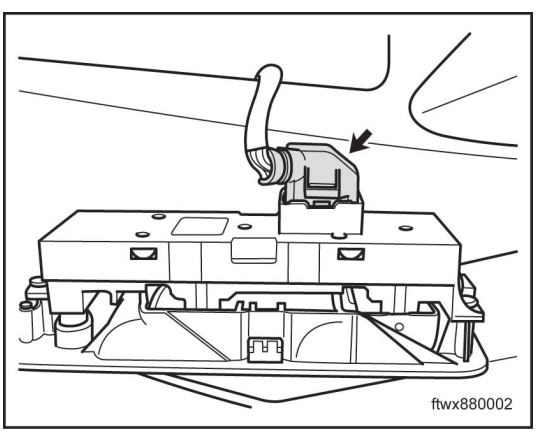
Check whether the result is normal?

Yes> go to step 3

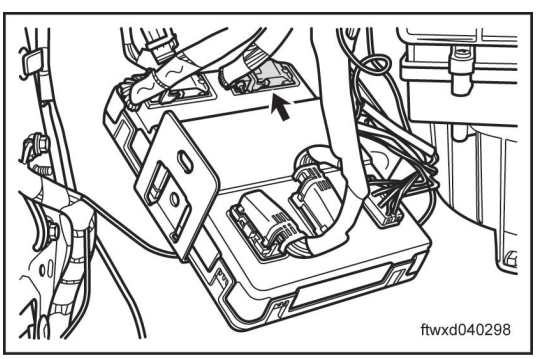
No > Maintenance or replace harness.

3 . Check harness and connector (power window switch, driver’s door-BCM control unit)

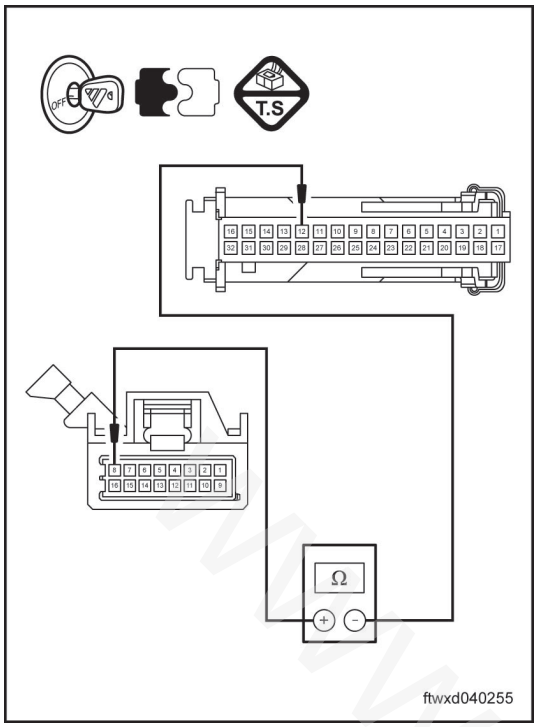
(a) Ignition Switch: OFF.



(b) Pull out power window switch J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
J004(8)-C035（D12）	＜2 Ω

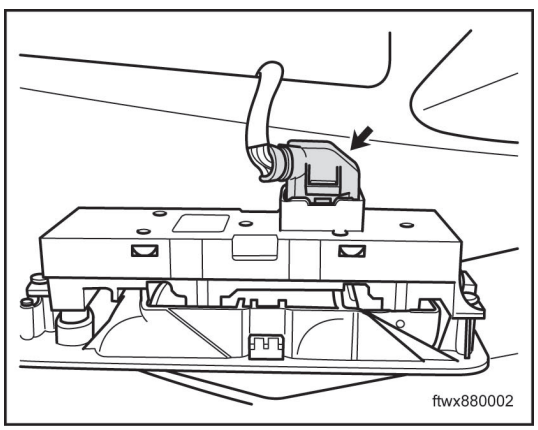
Check whether the result is normal?

Yes> go to step 4

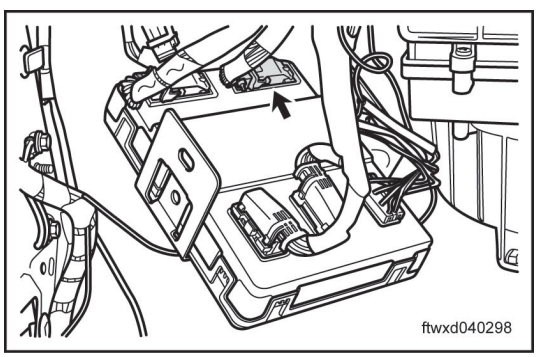
No > Maintenance or replace harness.

4 . Check harness and connector (power window switch, driver’s door-ground)

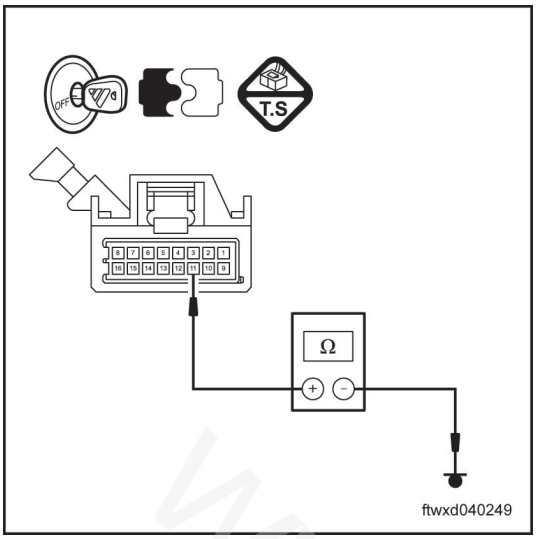
(a) Ignition Switch: OFF.



(b) Pull out power window switch J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
J040 (11) ground	＜2 Ω

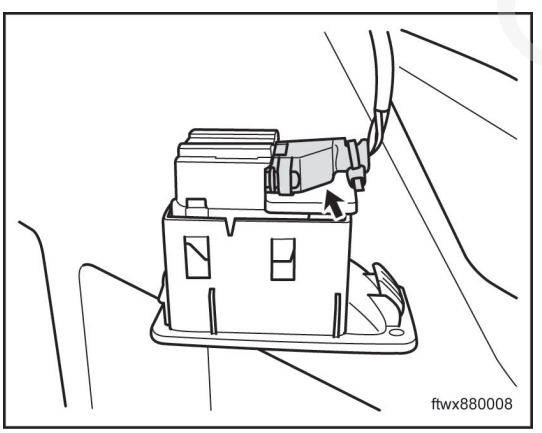
Check whether the result is normal?

Yes> Replace power window switch, driver’s door.

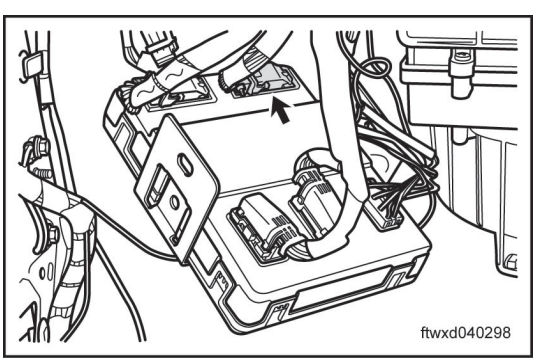
No > Maintenance or replace harness.

5 . Check harness and connector (power window switch, assistant driver’s door-BCM control unit)

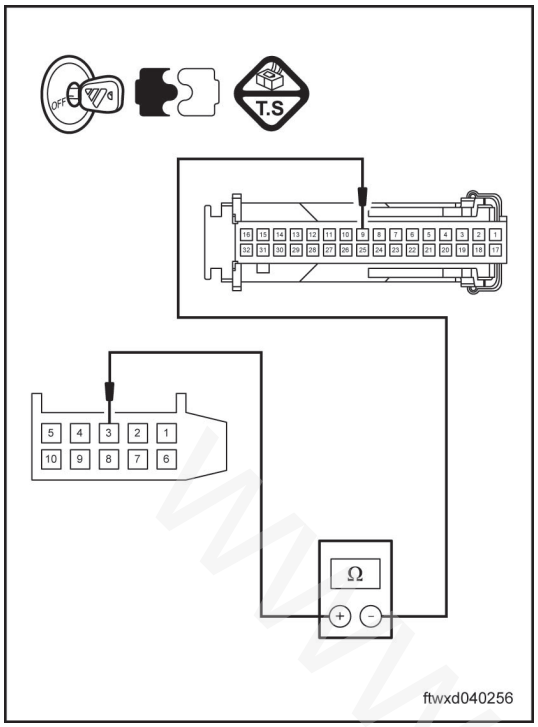
(a) Ignition Switch: OFF.



(b) Pull out power window switch G003, assistant driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Multimeter connection	Standard value
G003(3)-C035（D9）	＜2 Ω

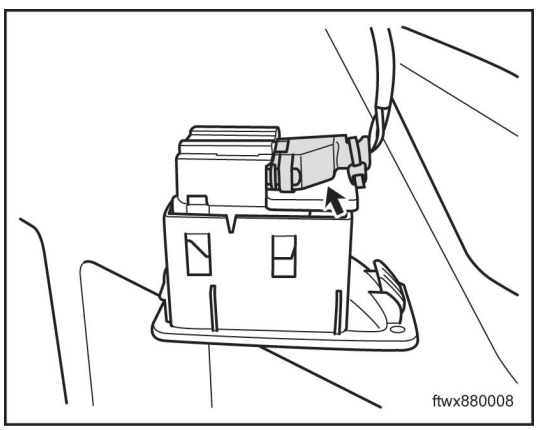
Check whether the result is normal?

Yes> go to step 6

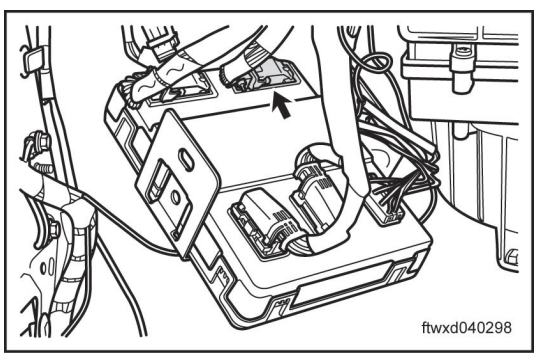
No > Maintenance or replace harness.

6 . Check harness and connector (, power window switch, assistant driver’s door-ground)

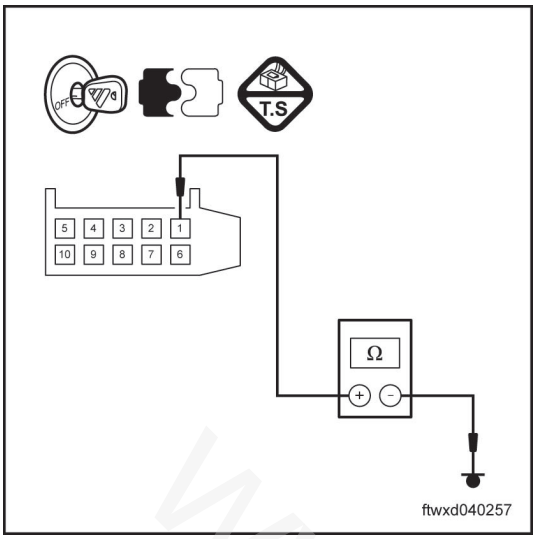
(a) Ignition Switch: OFF.



(b) Pull out power window switch G003, assistant driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
G003 (1) ground	＜2 Ω

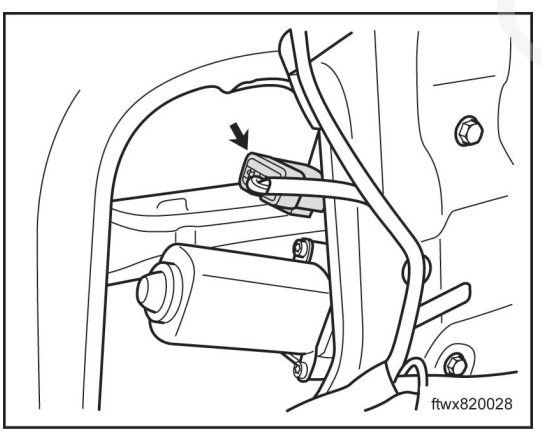
Check whether the result is normal?

Yes> Replace power window switch, assistant driver’s door.

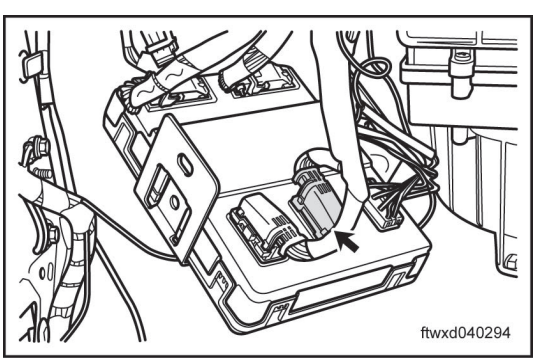
No > Maintenance or replace harness.

7 . Check harness and connector (power window motor, assistant driver’s door-BCM control unit)

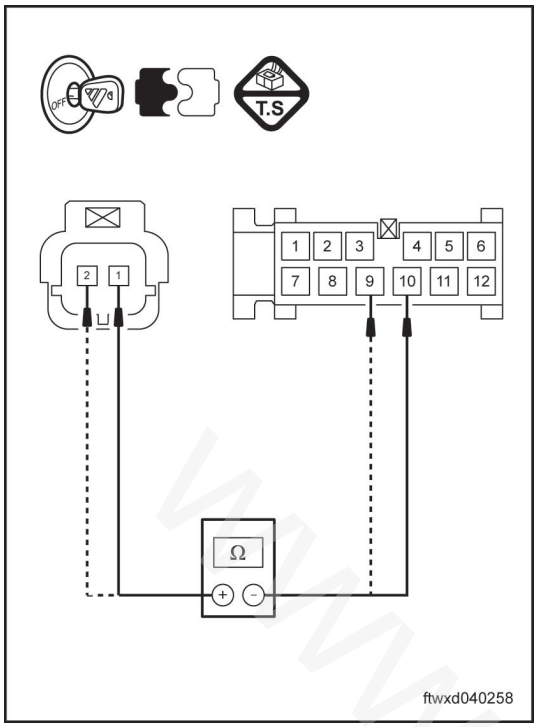
(a) Ignition Switch: OFF.



(b) Pull out power window motor G001, assistant driver’s door



(c) Disconnect connector C032, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
G001(T1)-C032（A10）	＜2 Ω
G001(T2)-C032（A9）	

Check whether the result is normal?

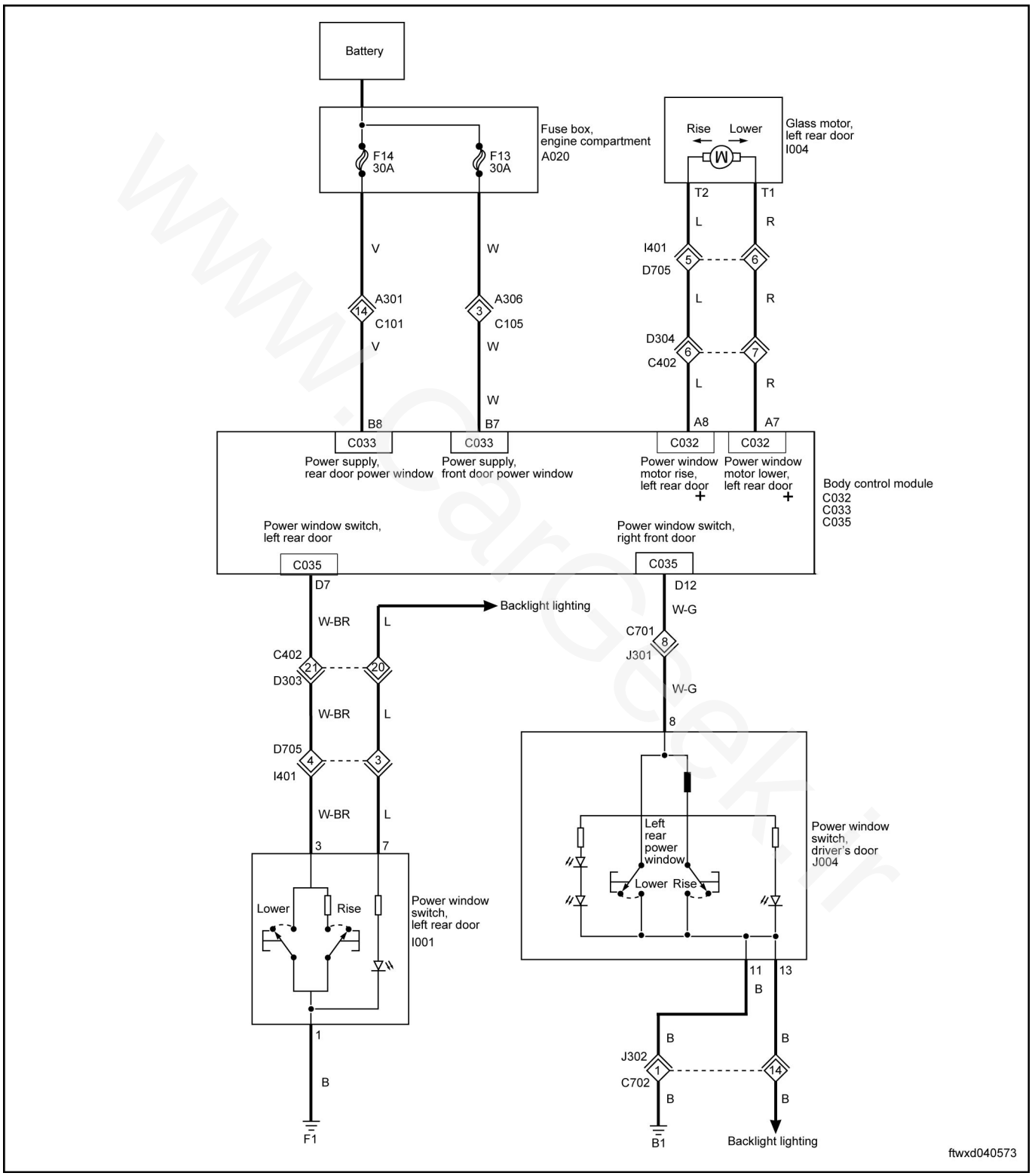
Yes> Replace power window motor, assistant driver’ s door.

No > Maintenance or replace harness.

B1362 LOW CURRENT OF CONTROL CIRCUIT, LEFT BACK WINDOW RISE

B1363 B1366THE RELAY OF CONTROL CIRCUIT FOR LEFT REAR WINDOW RISE IS STUCK AT THE “NO” LOCATION

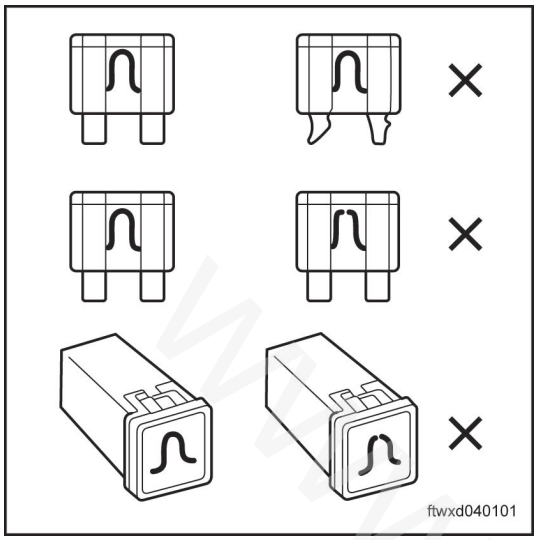
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.



(b) Check fuse inside fuse box, engine compartment : F14 (30A).

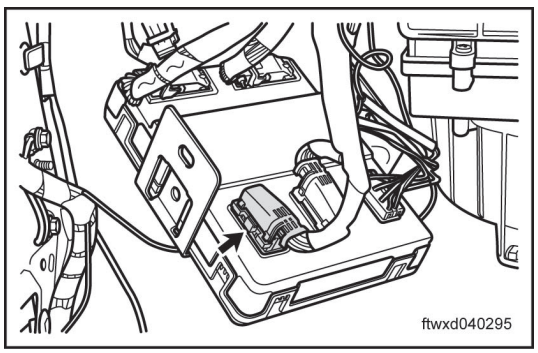
Check whether the result is normal?

Yes> go to step 2

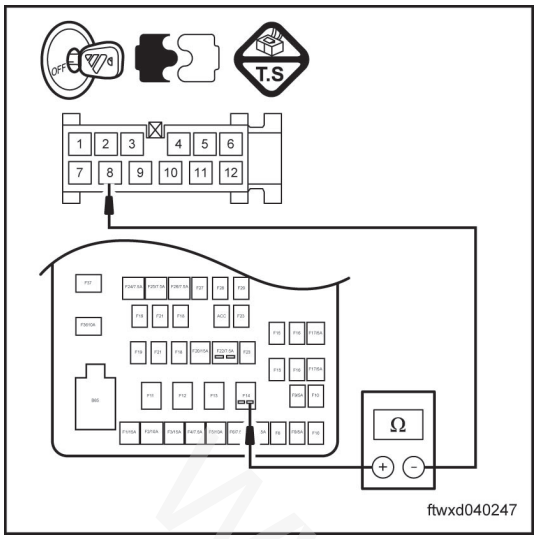
No> replace fuse

2 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect connector C033 , BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F14（30A） - C033（B8）	＜2 Ω

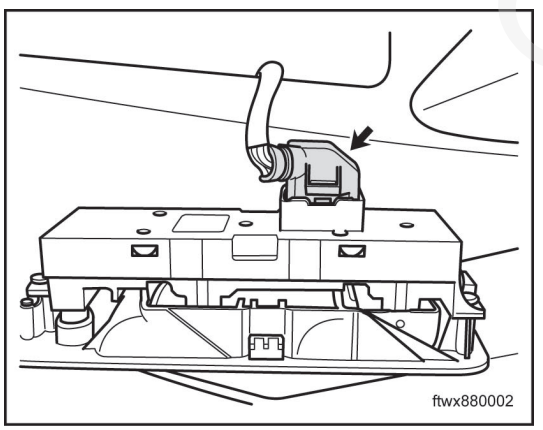
Check whether the result is normal?

Yes> go to step 3

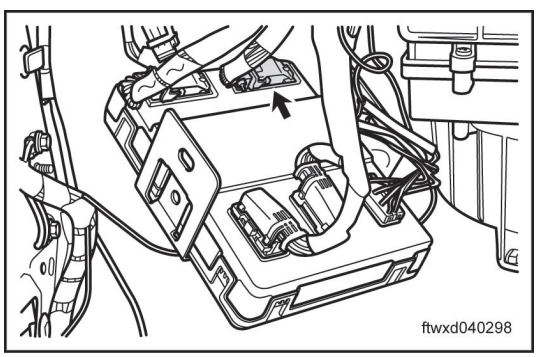
No > Maintenance or replace harness.

3 . Check harness and connector (power window switch, driver’s door-BCM control unit)

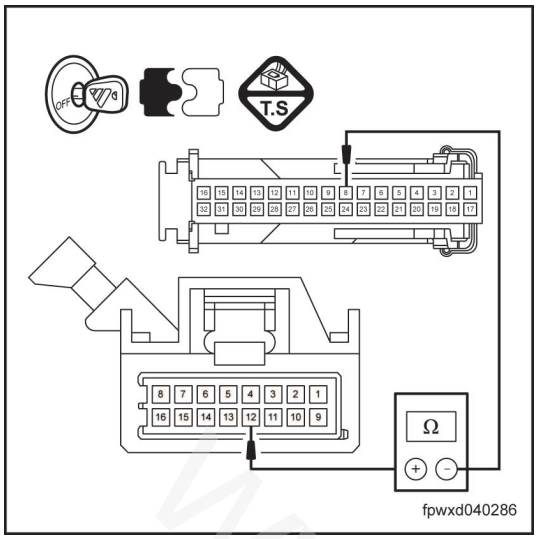
(a) Ignition Switch: OFF.



(b) Pull out power window switch J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
J004（8）- C035（D12）	＜2 Ω

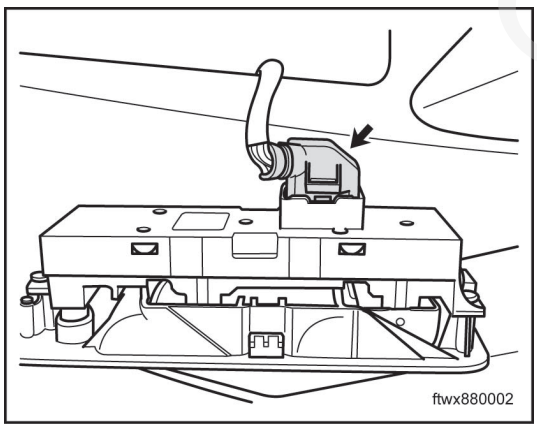
Check whether the result is normal?

Yes> go to step 4

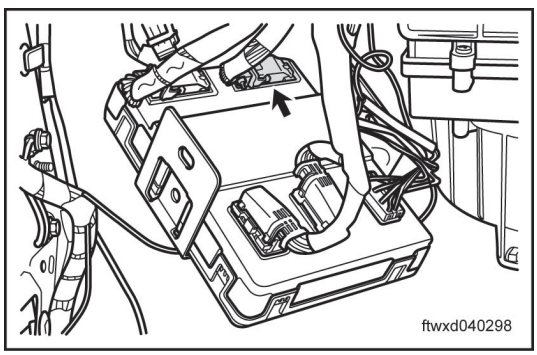
No > Maintenance or replace harness.

4 . Check harness and connector (power window switch, driver’s door-ground)

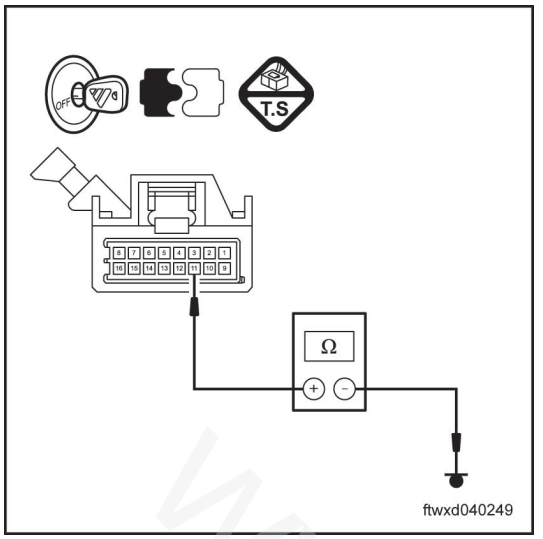
(a) Ignition Switch: OFF.



(b) Pull out Power window switch connector J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
J040 (11) ground	＜ 2 Ω

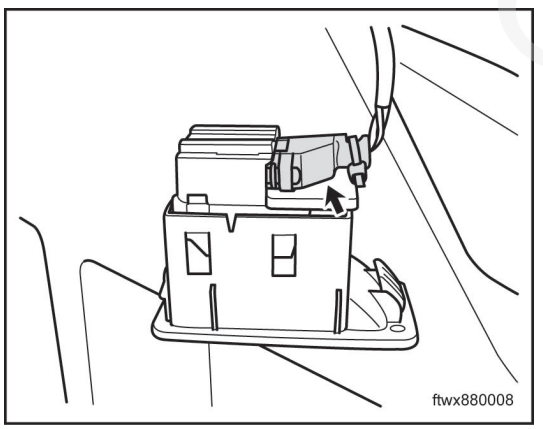
Check whether the result is normal?

Yes> Replace power window switch, driver’ s door.

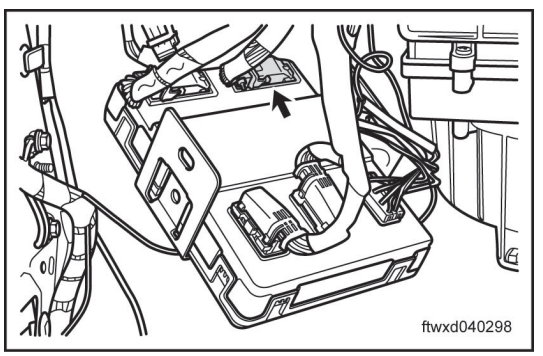
No > Maintenance or replace harness.

5 . Check harness and connector (power window switch, left rear door-BCM control unit)

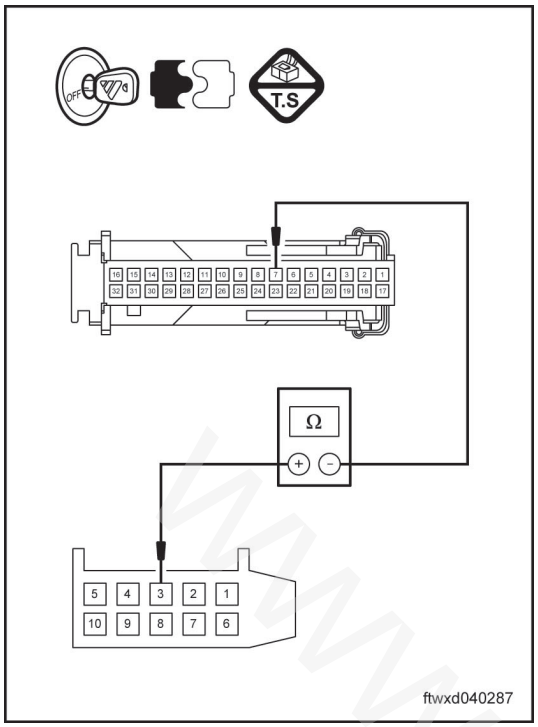
(a) Ignition Switch: OFF.



(b) Pull out power window switch I001, left rear door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
I001（3）- C035（D7）	＜ 2 Ω

04

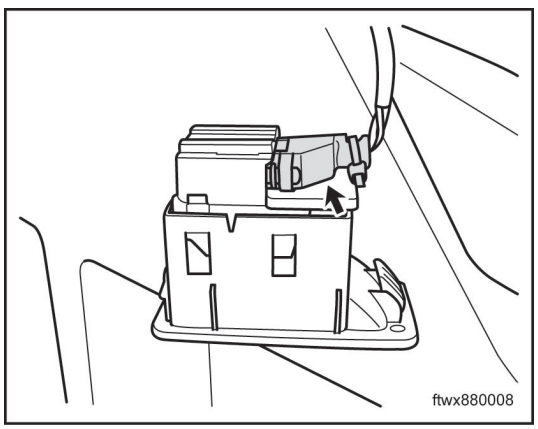
Check whether the result is normal?

Yes> go to step 6

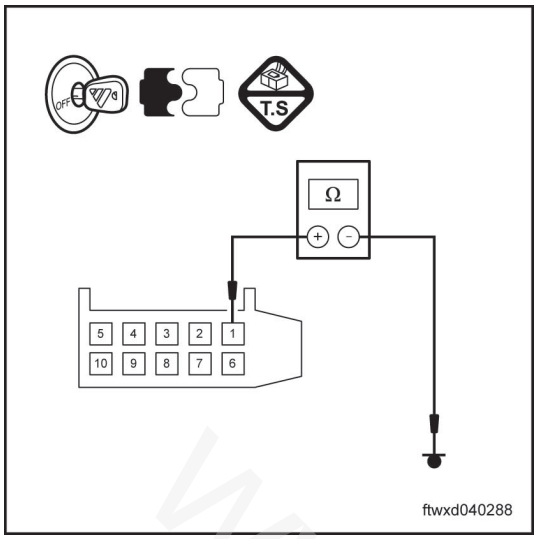
No > Maintenance or replace harness.

6 . Check harness and connector (power window switch, left rear door-ground)

(a) Ignition Switch: OFF.



(b) Pull out power window switch I001, left rear door



(c) Measure the electrical resistance based on the value in the following form.

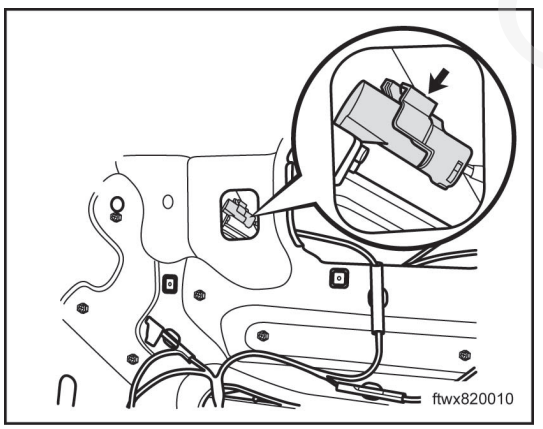
Check whether the result is normal?

Yes> Replace power window switch, left rear door.

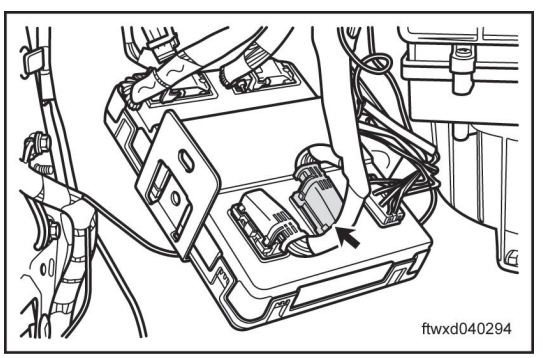
No > Maintenance or replace harness.

7 . Check harness and connector (power window motor, left rear door-BCM control unit)

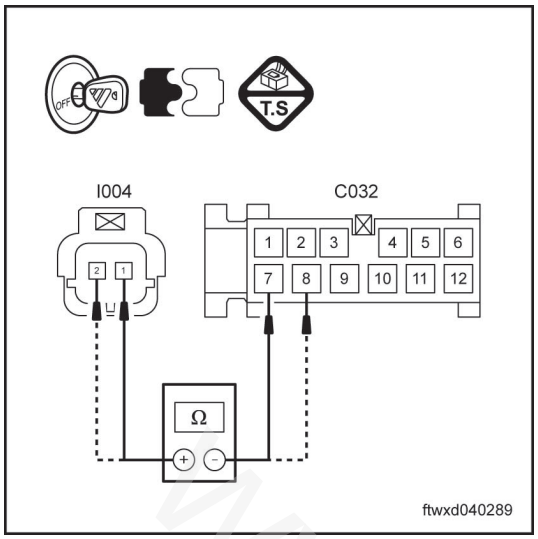
(a) Ignition Switch: OFF.



(b) Press down power window motor I004, left rear door



(c) Disconnect connector C032, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
I004（T1） - C032（A7）	＜2 Ω
I004（T2） - C032（A8）	

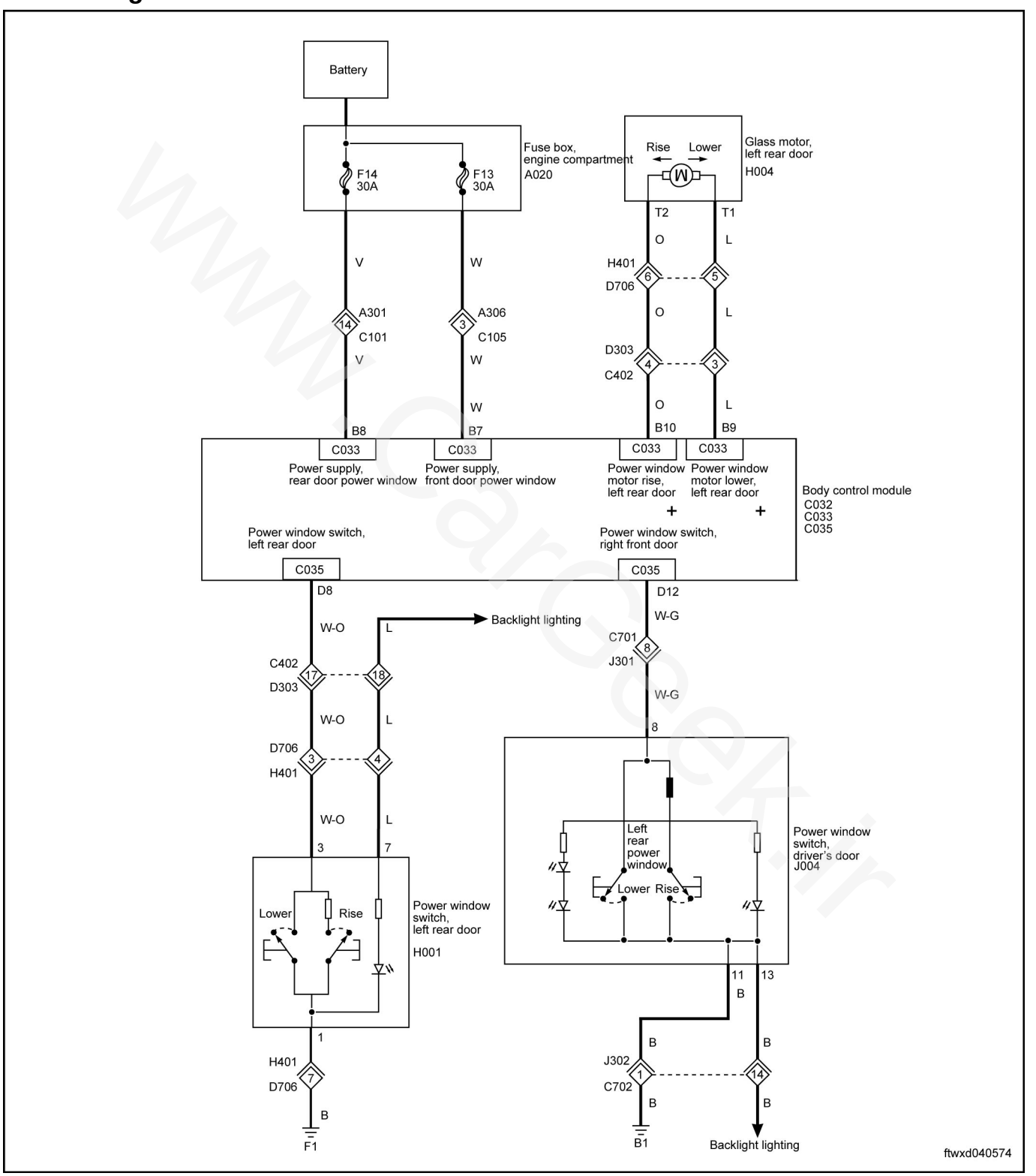
Check whether the result is normal?

Yes> Replace power window motor, left rear door.

No > Maintenance or replace harness.

B1368 B1371LOW CURRENT OF CONTROL CIRCUIT, RIGHT BACK WINDOW RISE
B1369 B1372CONTROL CIRCUIT RELAY OF RIGHT REAR WINDOW IS STUCK AT ON LOCATION

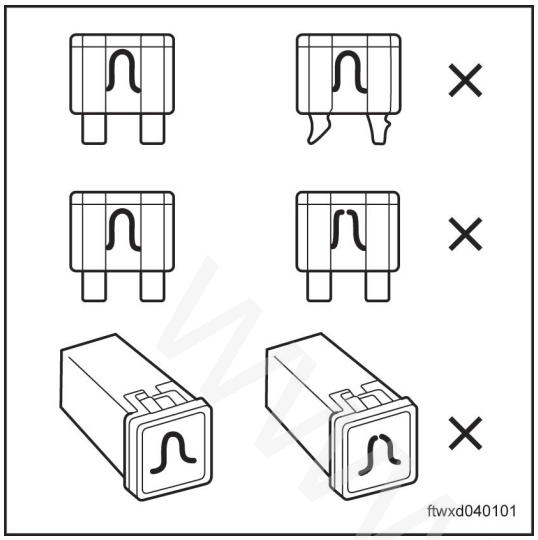
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.



(b) Check fuse inside fuse box, engine compartment : F14 (30 A).

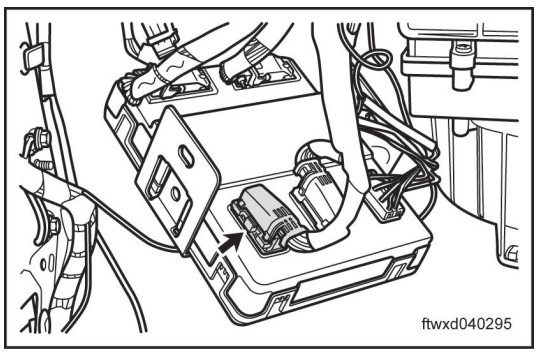
Check whether the result is normal?

Yes> go to step 2

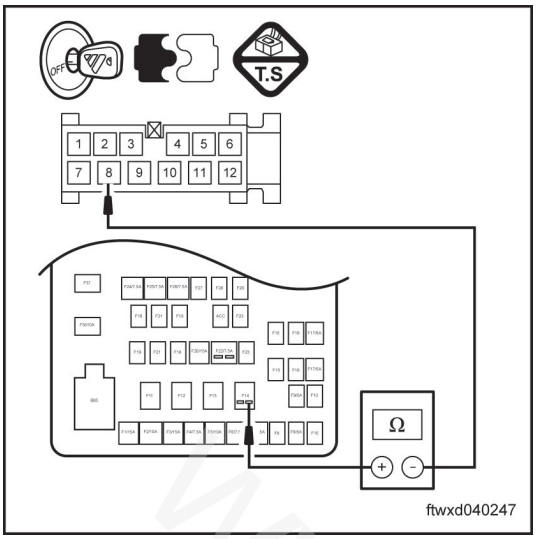
No> replace fuse

2 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect connector C033 , BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F14(30A)-C033（B8）	＜2 Ω

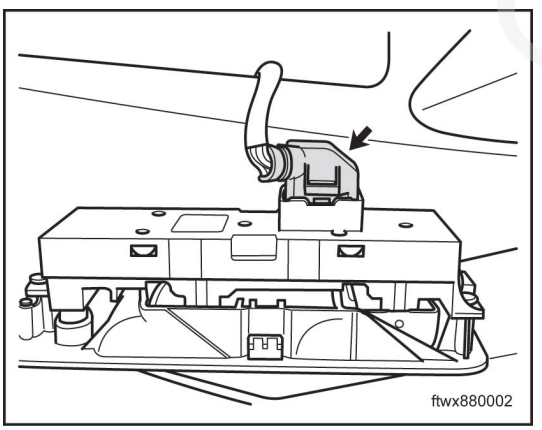
Check whether the result is normal?

Yes> go to step 3

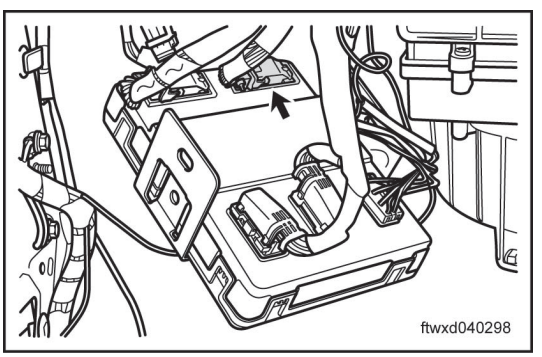
No > Maintenance or replace harness.

3 . Check harness and connector (power window switch, driver’s door-BCM control unit)

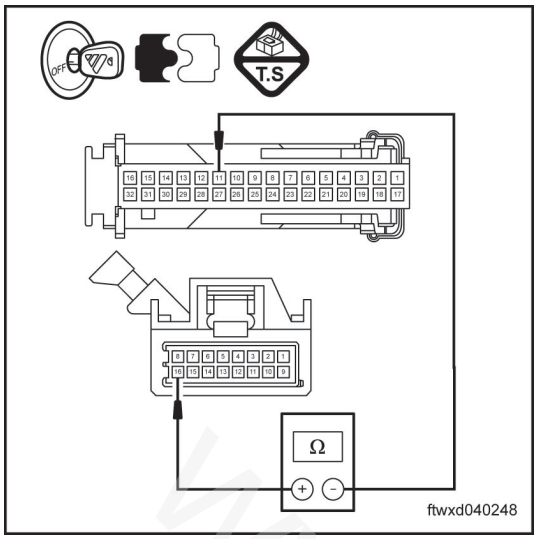
(a) Ignition Switch: OFF.



(b) Pull out power window switch J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
J004(8)-C035（D12）	＜2 Ω

04

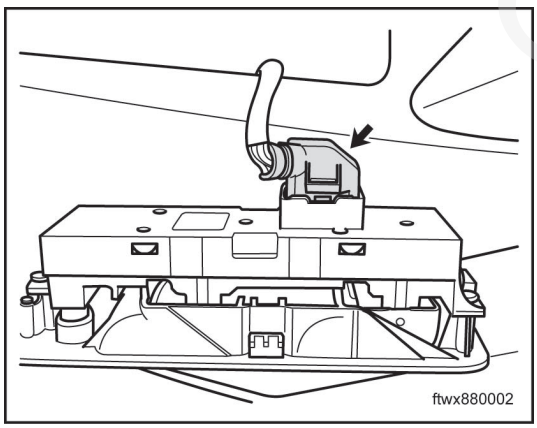
Check whether the result is normal?

Yes> go to step 4

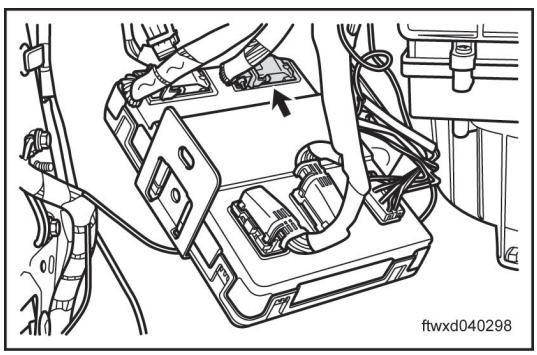
No > Maintenance or replace harness.

4 . Check harness and connector (power window switch, driver’s door-ground)

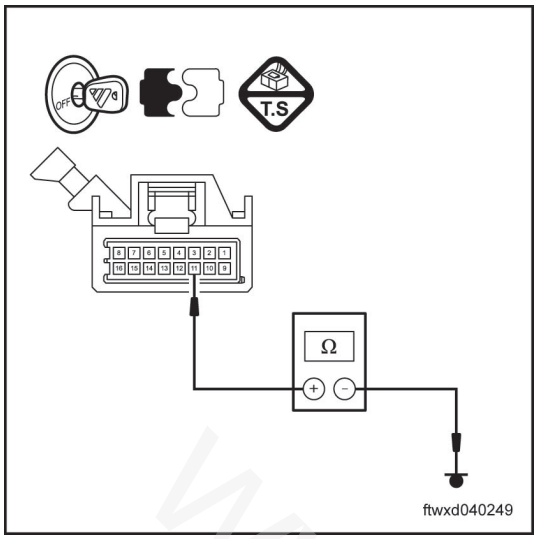
(a) Ignition Switch: OFF.



(b) Pull out power window switch J004, driver’s door



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
Power window switch (11), driver’s door, ground	＜2 Ω

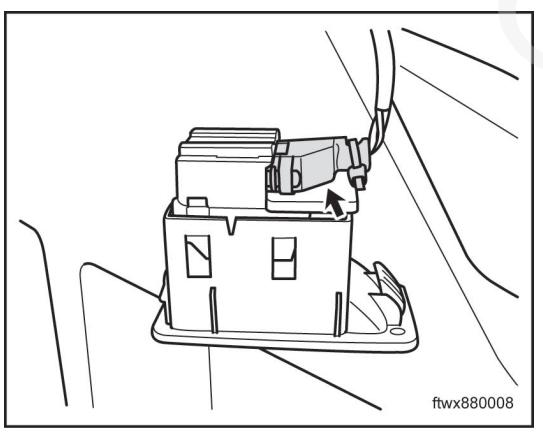
Check whether the result is normal?

Yes> Replace power window switch, driver’s door.

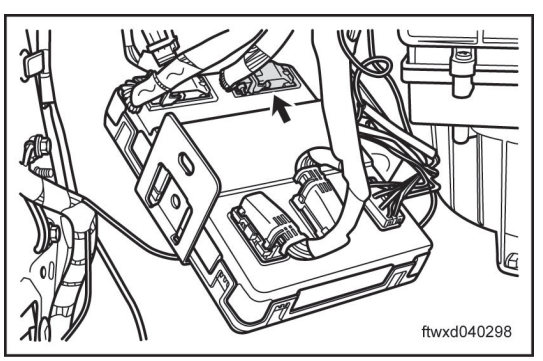
No > Maintenance or replace harness.

5 . Check harness and connector (power window switch, right rear door-BCM control unit)

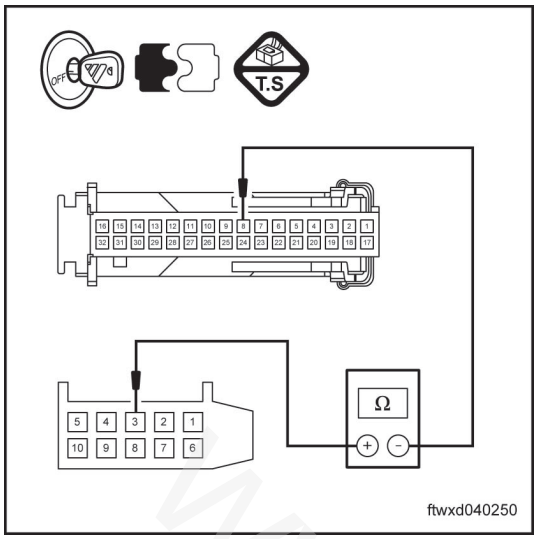
(a) Ignition Switch: OFF.



(b) Press down power window switch H001, right rear door.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
H001(3)-C035（D8）	＜ 2 Ω

04

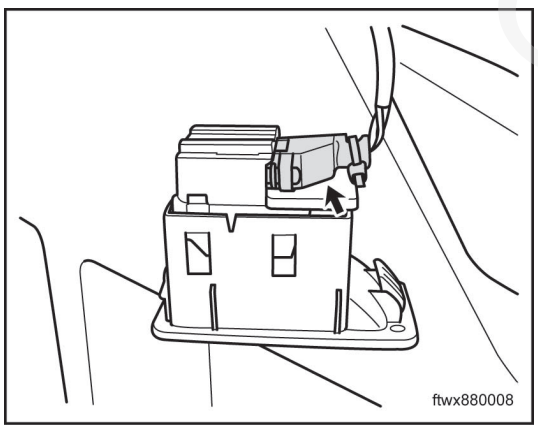
Check whether the result is normal?

Yes> go to step 6

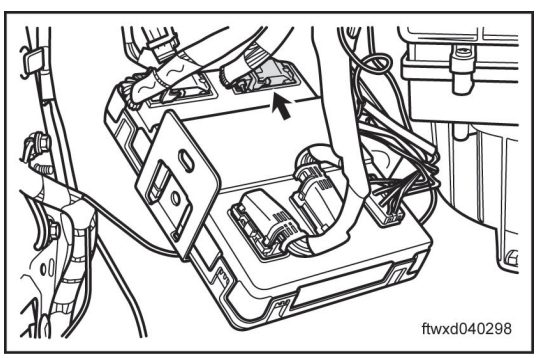
No > Maintenance or replace harness.

6 . Check harness and connector (power window switch, right rear door-ground)

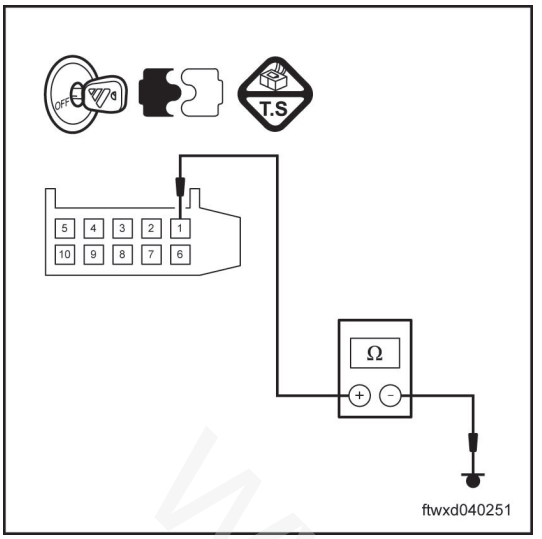
(a) Ignition Switch: OFF.



(b) Press down power window switch H001, right rear door.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
H001(1) ground	< 2 Ω

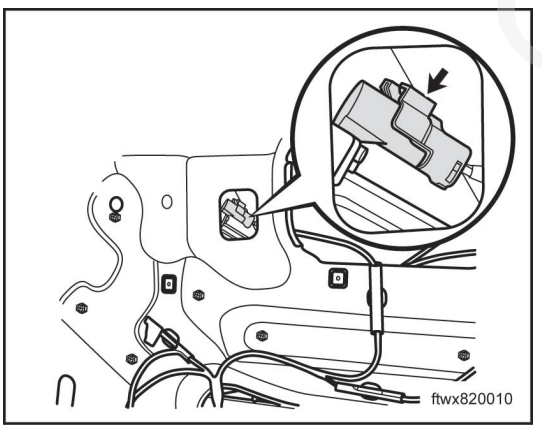
Check whether the result is normal?

Yes> Replace power window switch, right rear door.

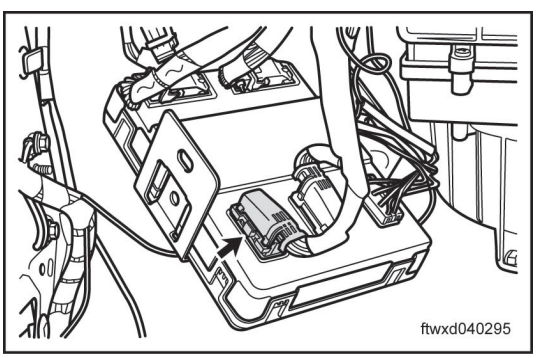
No > Maintenance or replace harness.

7 . Check harness and connector (power window motor, right rear door-BCM control unit)

(a) Ignition Switch: OFF.

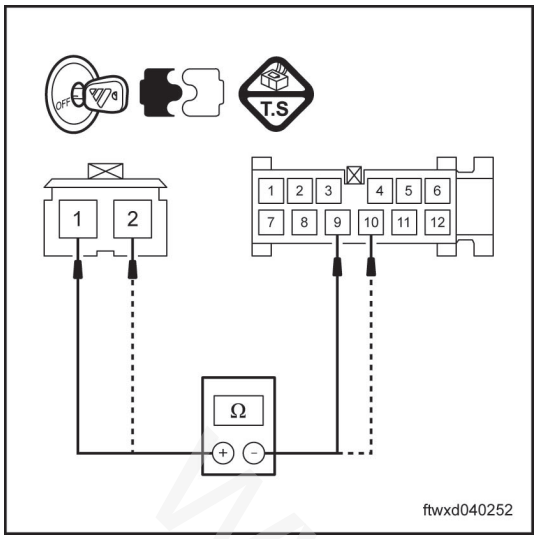


(b) Press down power window motor H004, right rear door



(c) Disconnect connector C033 , BCM control unit.

8 . Measure the electrical resistance based on the value in the following form.



(a) Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
H004(T1)-C033（B9）	＜2 Ω
H004(T2)-C033（B10）	

Check whether the result is normal?

Yes> Replace power window motor, right rear door.

No > Maintenance or replace harness.

REAR WINDSCREEN DEFROST SYSTEM

SYSTEM SPECIFICATION

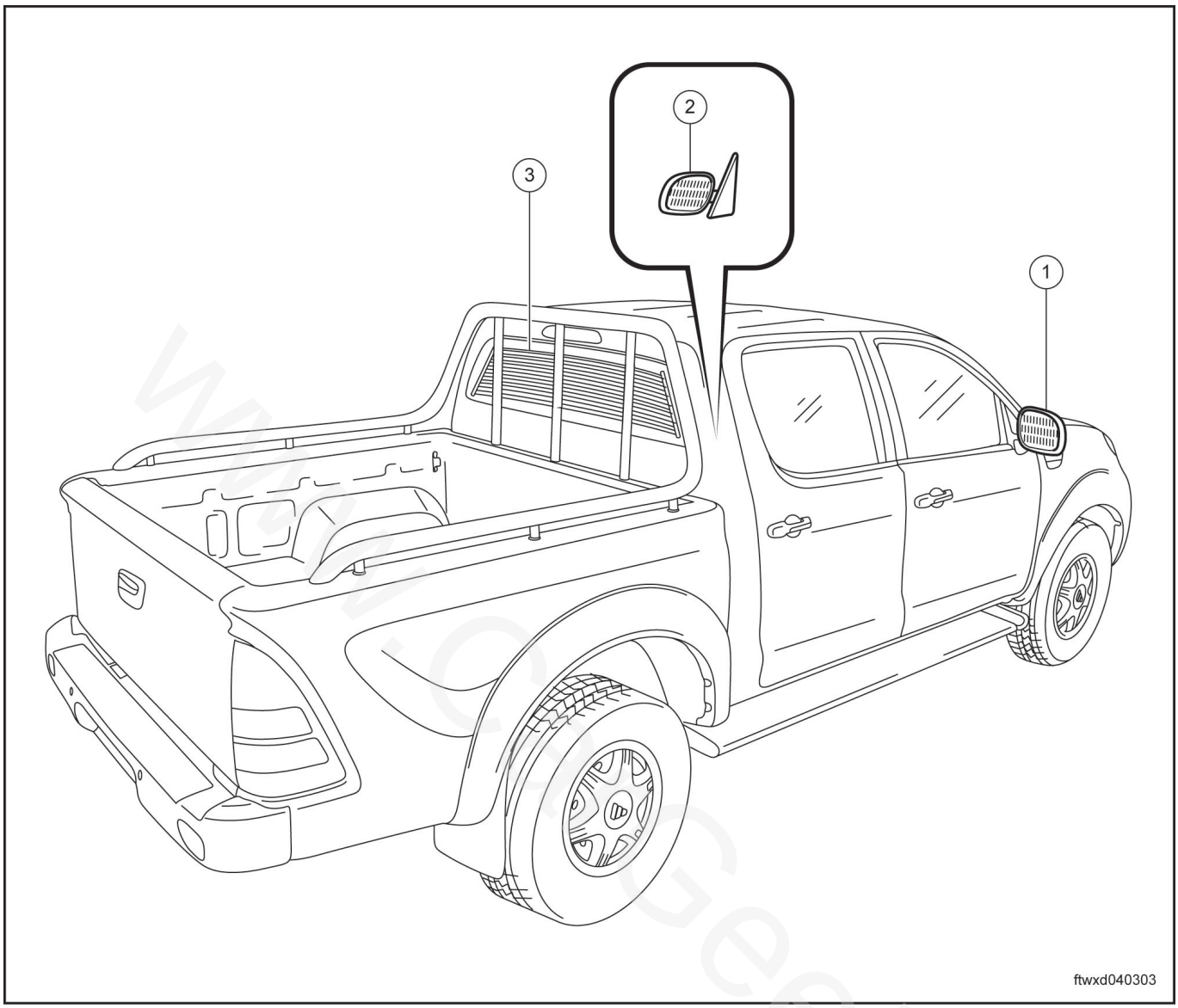
1 . Summary

The thin heating wire of rear windscreen defrost system is installed inside the rear window, which can defrost the surface of window fast. The rear defrost switch controls the defrost work of the rear windscreen defroster, when pressing down the rear defrost switch, rear windscreen defroster begin the work.

2 . Components functions

Components	Brief introduction
Defrost relay	**Receive the start request signal from rear defroster, and connect to the circuit of rear windscreen defroster, to power up the rear windscreen defroster.**
Rear windscreen defroster	**Receive power supply from defrost relay, heat the heating wire of defogger, and defrost the rear windscreen.**

COMPONENTS DRAWING



1	Right rearview mirror heating wire
2	Left rearview mirror heating wire
3	Rear windscreen defrost heating wire

BASIC INSPECTION

Steps	Inspection step		Measures
1	**Check Battery voltage** • Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Charge or replace the battery. (Refer to "Chapter 20. Start & charge - battery, overhaul")
2	**Check the Ignition Switch** • Check whether the ignition switch is working properly. **Check whether the result is normal?**	Yes	No> go to step 3
		No?	Maintain or replacement of ignition switch. Chapter 91. Vehicle control system - ignition switch assembly, removal & installation")
3	**Check fuse** • Check whether the fuse is good or not? **Check whether the result is normal?**	Yes	No> go to step 4
		No?	to Defect Phenomenon Form
4	**Check rear defrost switch** • Check whether the deforst switch is working properly. **Check whether the result is normal?**	Yes	Replace rear defrost switch (Refer to "Chapter 83. Dashboard/instruments - instrument panel, replacement")
		No?	No> go to step 5
5	**Check rear windscreen defroster** • Check whether the defroster is working properly. **Check whether the result is normal?**	Yes	Replace rear windscreen defroster (Refer to "Chapter 82. Windscreen/window glass/rearview mirror -windscreen, replacement")
		No?	to Defect Phenomenon Form

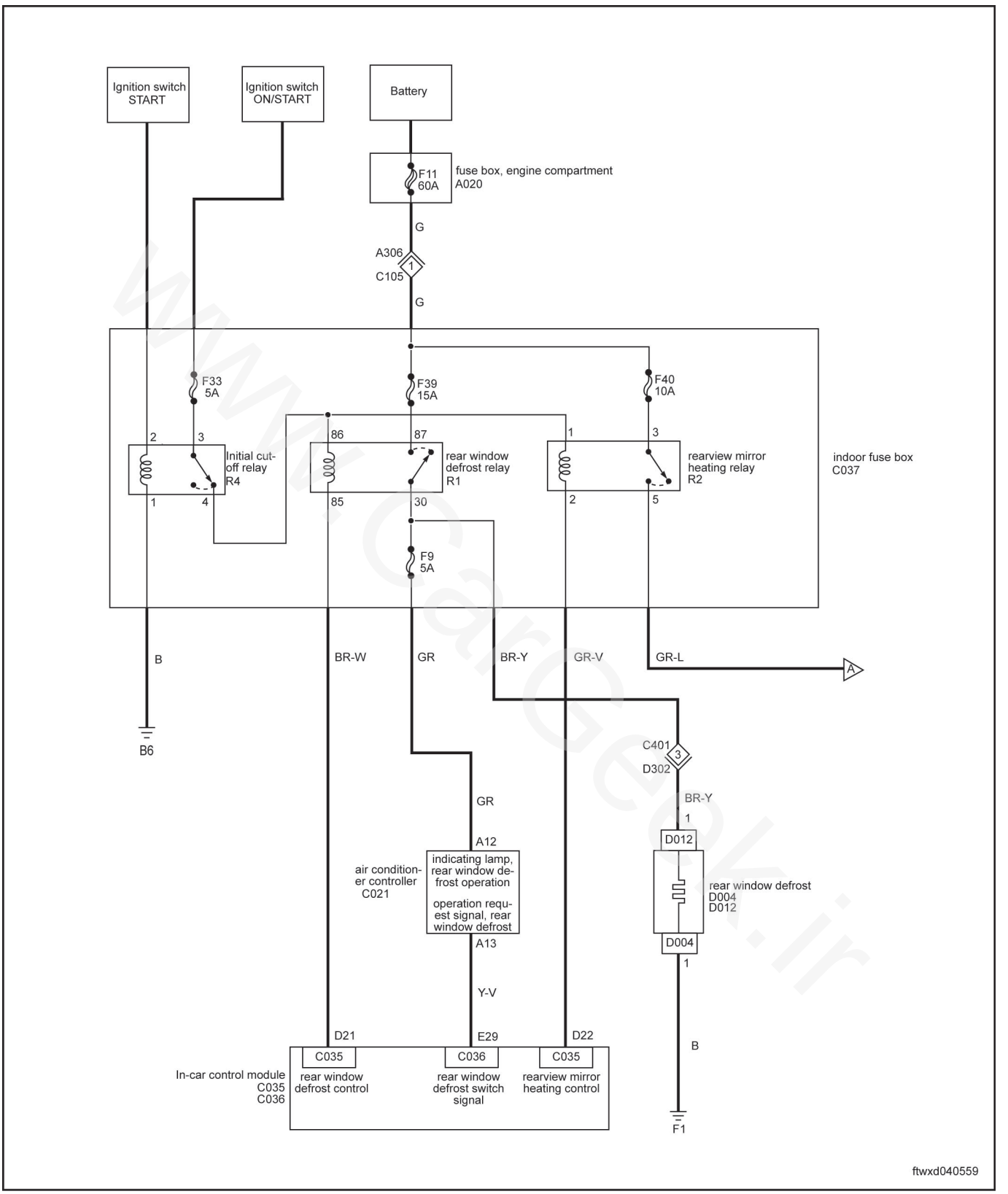
DEFECT PHENOMENON FORM

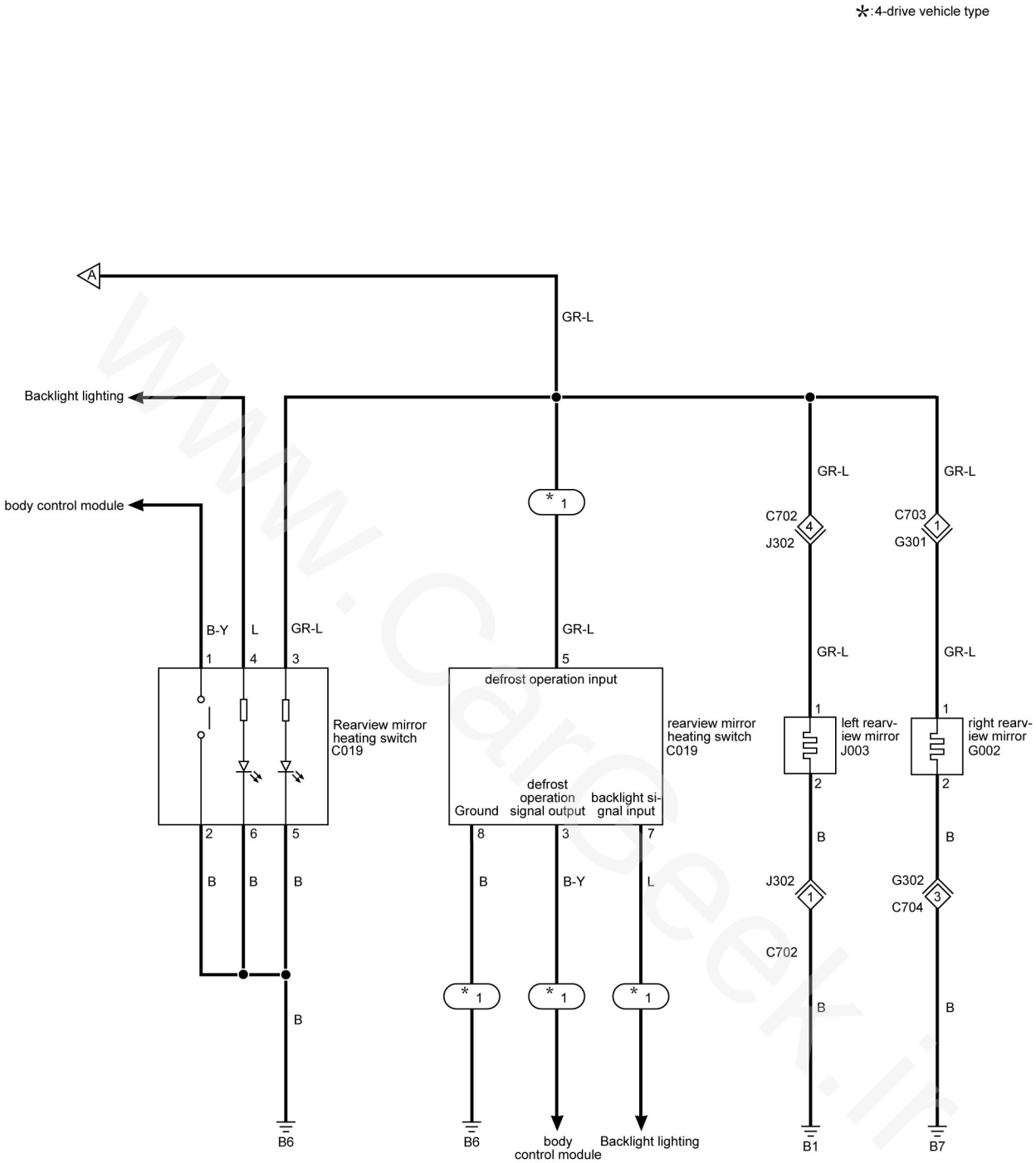
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Defect phenomenon	Suspect Area	Reference
Rear windscreen defroster doesn’t work.	1. Fuse	-
	2. Relay	-
	3.Rear defrost switch	Chapter 83. Dashboard/instruments - instrument panel, replacement
	4.Rear windscreen defroster	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement
Defrost control open circuit defrost control circuit high current	1. Fuse	-
	2. Relay	-
	3.Rear defrost switch	Chapter 83. Dashboard/instruments - instrument panel, replacement
	4.Rear windscreen defroster	Chapter 82. Windscreen/window glass /rearview mirror – power window, replacement

REAR WINDSCREEN DEFROSTER DOESN’T WORK.

Circuit diagram

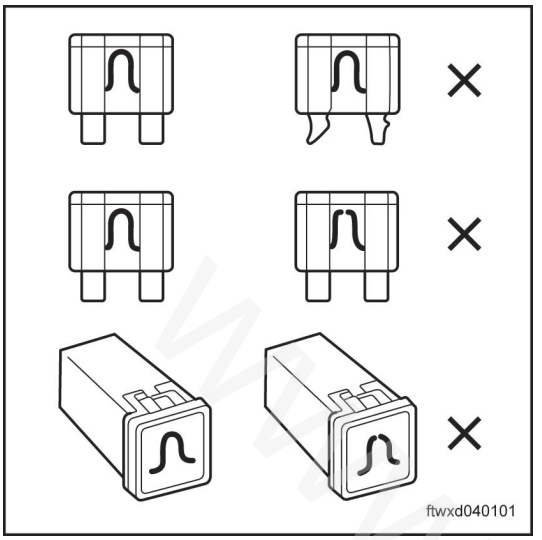




Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check fuse : F11 (60A).inside fuse box, engine compartment

(c) Check fuses: F:33(5A), F39 (15A) inside fuse box of the body.

Check whether the result is normal?

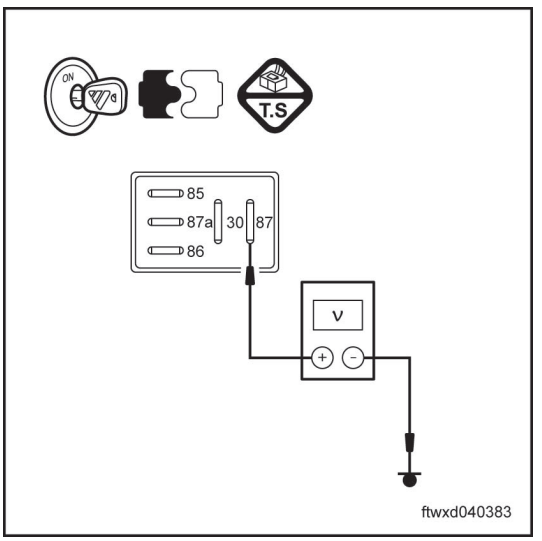
Yes> go to step 4

No> replace fuse

2 . Check harness and connector (defrost relay--ground)

(a) Ignition Switch: ON.

(b) Pull out rear windscreen defrost relay R1 inside fuse box of body.



(c) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Multimeter connection
R1(87) ground	Battery voltage

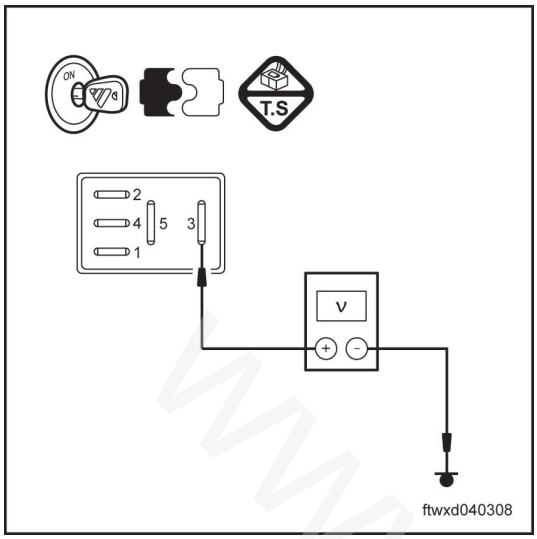
Check whether the result is normal?

Yes> go to step 3

No > Maintenance or replace harness.

3 . Check harness and connector (start and cut-off relay--ground)

(a) Ignition Switch: ON.
(b) Pull out start and cut-off relay R4 inside fuse box of body.



(c) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Multimeter connection
R4(3) ground	Battery voltage

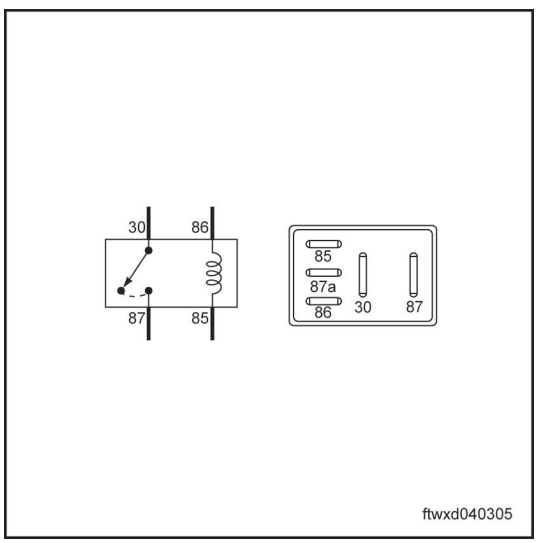
Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

4 . Check the relay

(a) Disconnect battery negative cable.
(b) Pull out rear windscreen defrost relay R1 inside fuse box of body.

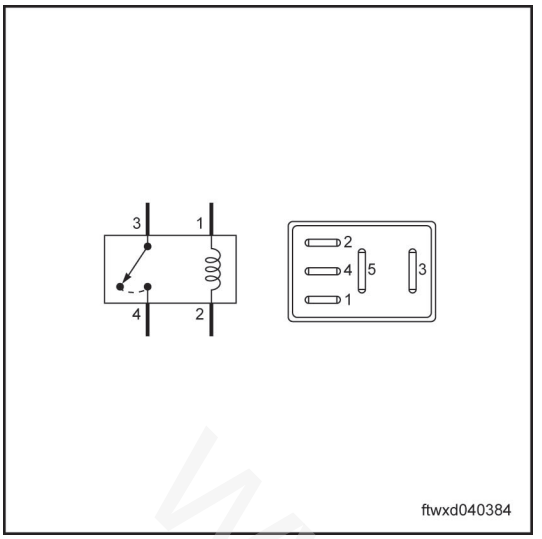


(c) Check rear windscreen defrost relay R1

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	85 - 86	Breakover
Apply power supply voltage to position between stitch 85 and 86,	30 - 87	< 2 Ω

(d) Pull out start and cut-off relay R4 inside fuse box of body.



(e) Check start and cut-off relay R4

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitch 1 and 2,	3 - 4	Cut-off

Check whether the result is normal?

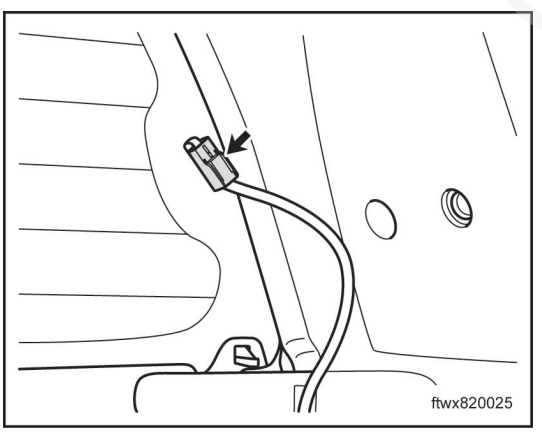
Yes> go to step 5

No>Replace relay

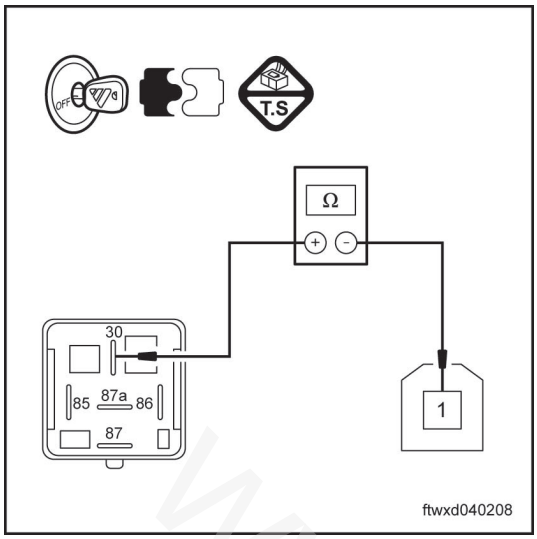
5 . Check harness and connector (rear defrost relay—body controller)

(a) Disconnect battery negative cable.

(b) Pull out rear windscreen defrost relay R1 inside fuse box of body.



(c) Disconnect connector D012 of rear windscreen defroster.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
D012 (1） - R1(30)	＜ 2 Ω

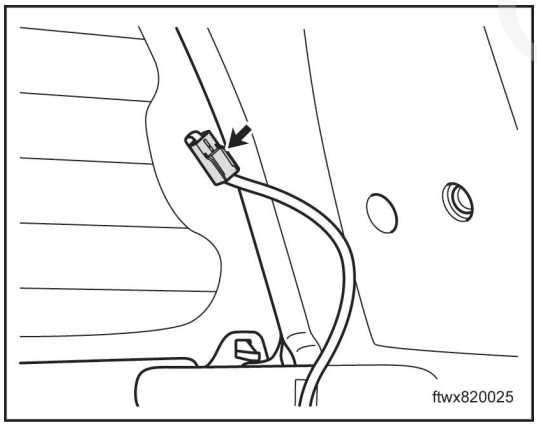
Check whether the result is normal?

Yes> go to step 6

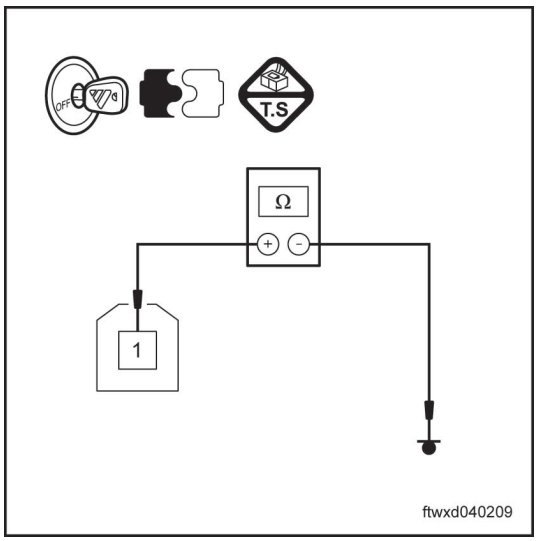
No > Maintenance or replace harness.

6 . Check harness and connector (rear windscreen defroster--ground)

(a) Ignition Switch: ON.



(b) Disconnect connector D004 of rear windscreen defroster.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
D004 (1) ground	＜ 2 Ω

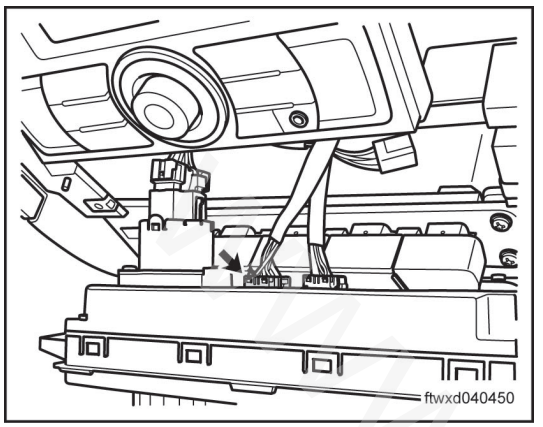
Check whether the result is normal?

Yes> go to step 7

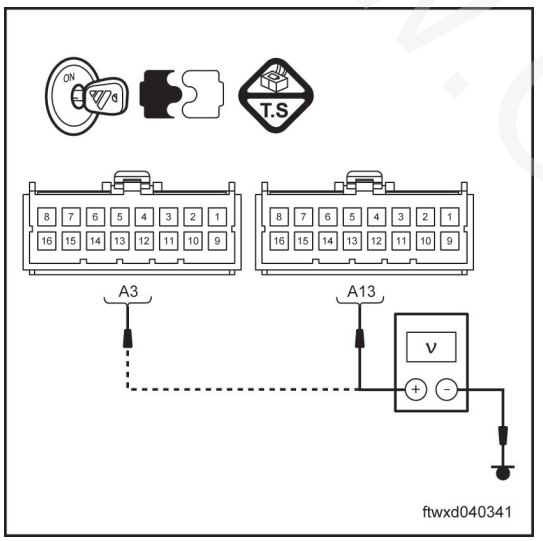
No > Maintenance or replace harness.

7 . Check harness and connector (defrost switch--ground)

(a) Ignition Switch: ON.



(b) Disconnect connector C021 of air-conditioner controller.



(c) Measure the voltage based on the value in the following form.

Automatic air conditioner

Standard voltage

Multimeter connection	Standard value
C021(A13) ground	Battery voltage

Manual air conditioner

Standard voltage

Multimeter connection	Standard value
C021(A3) ground	Battery voltage

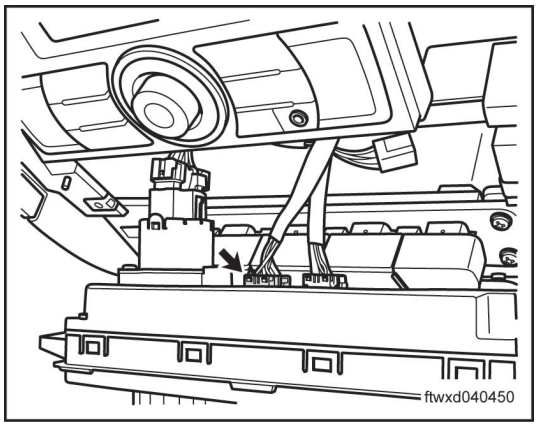
Check whether the result is normal?

Yes> go to step 8

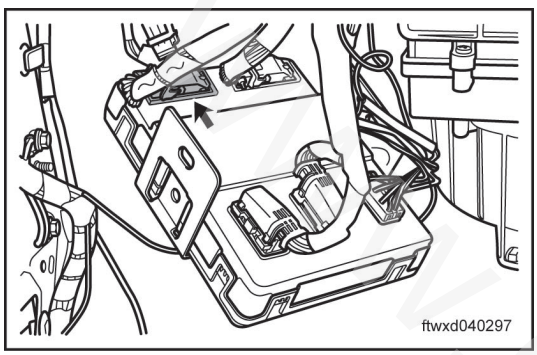
No> replace body controller

8 . Check harness and connector (defrost switch—body controller)

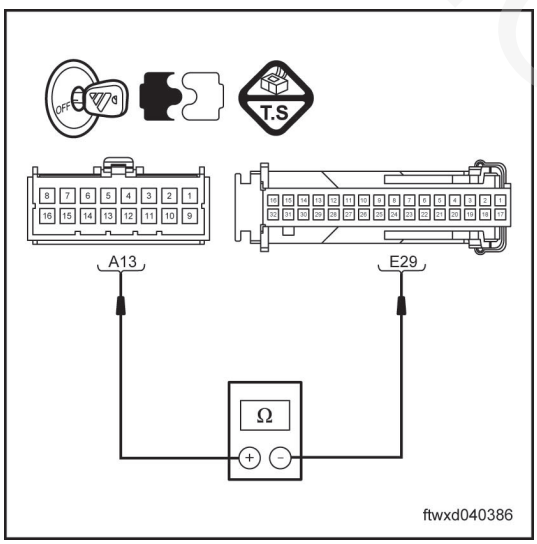
(a) Disconnect battery negative cable.



(b) Disconnect connector C021 of air-conditioner controller.



(c) Disconnect connector C036, body controller



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C021 (A13） - C036(E29)	＜ 2 Ω

Check whether the result is normal?

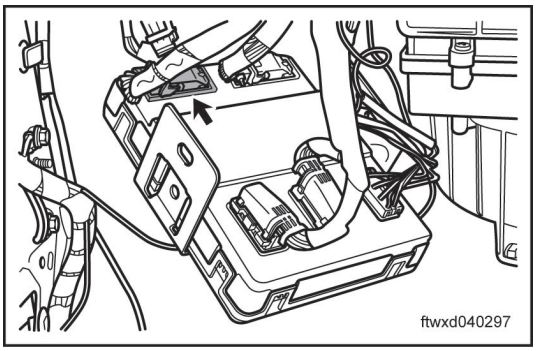
Yes> go to step 9

No > Maintenance or replace harness.

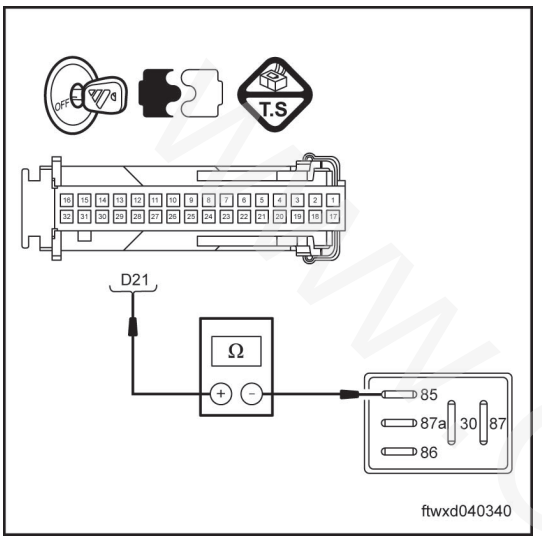
9 . Check harness and connector (rear defrost relay—body controller)

(a) Disconnect battery negative cable.

(b) Pull out rear windscreen defrost relay R1 inside fuse box of body.



(c) Disconnect connector C036, body controller



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C036 (E21） - R1(85)	＜ 2 Ω

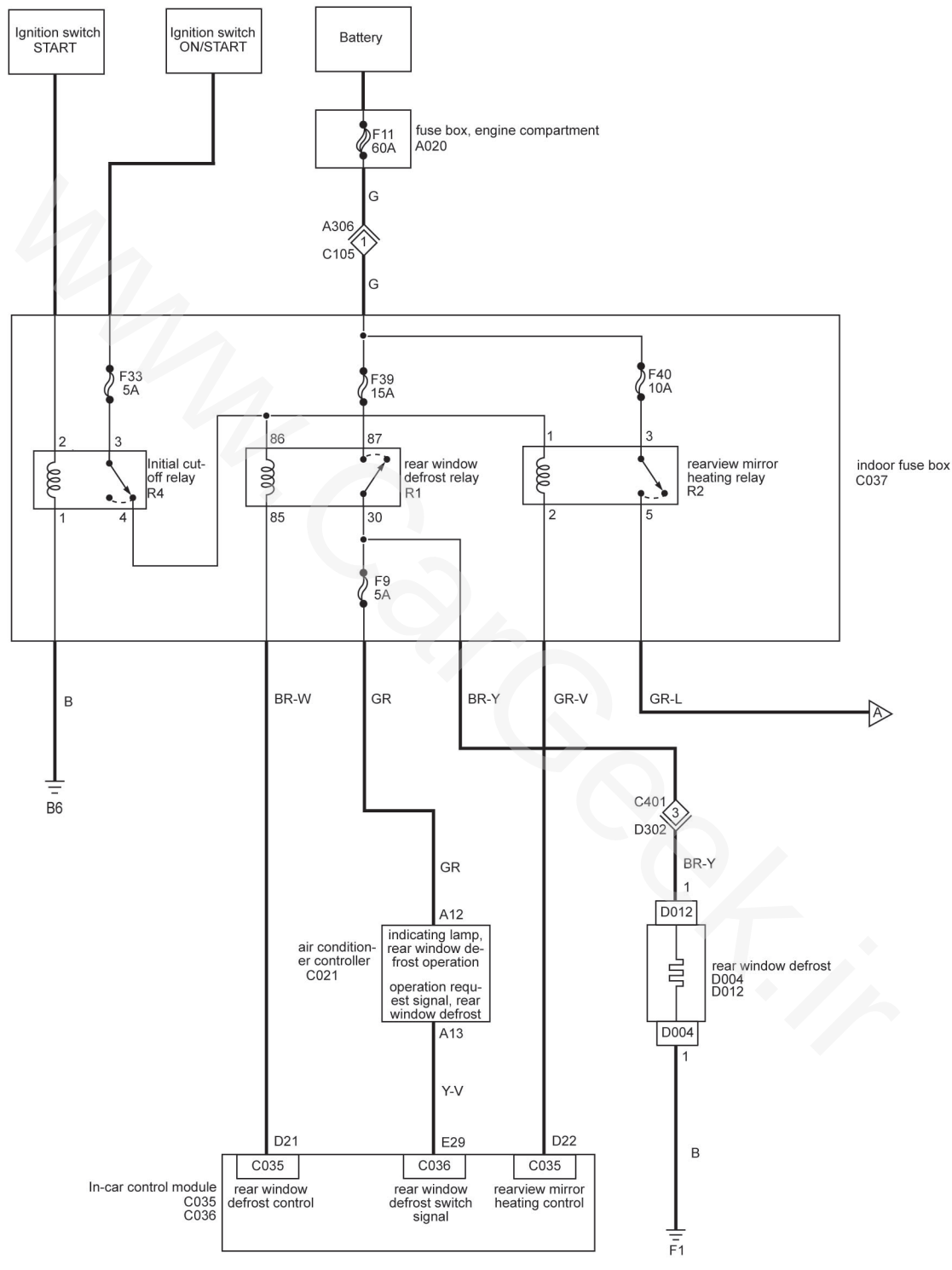
Check whether the result is normal?

Yes> replace body controller

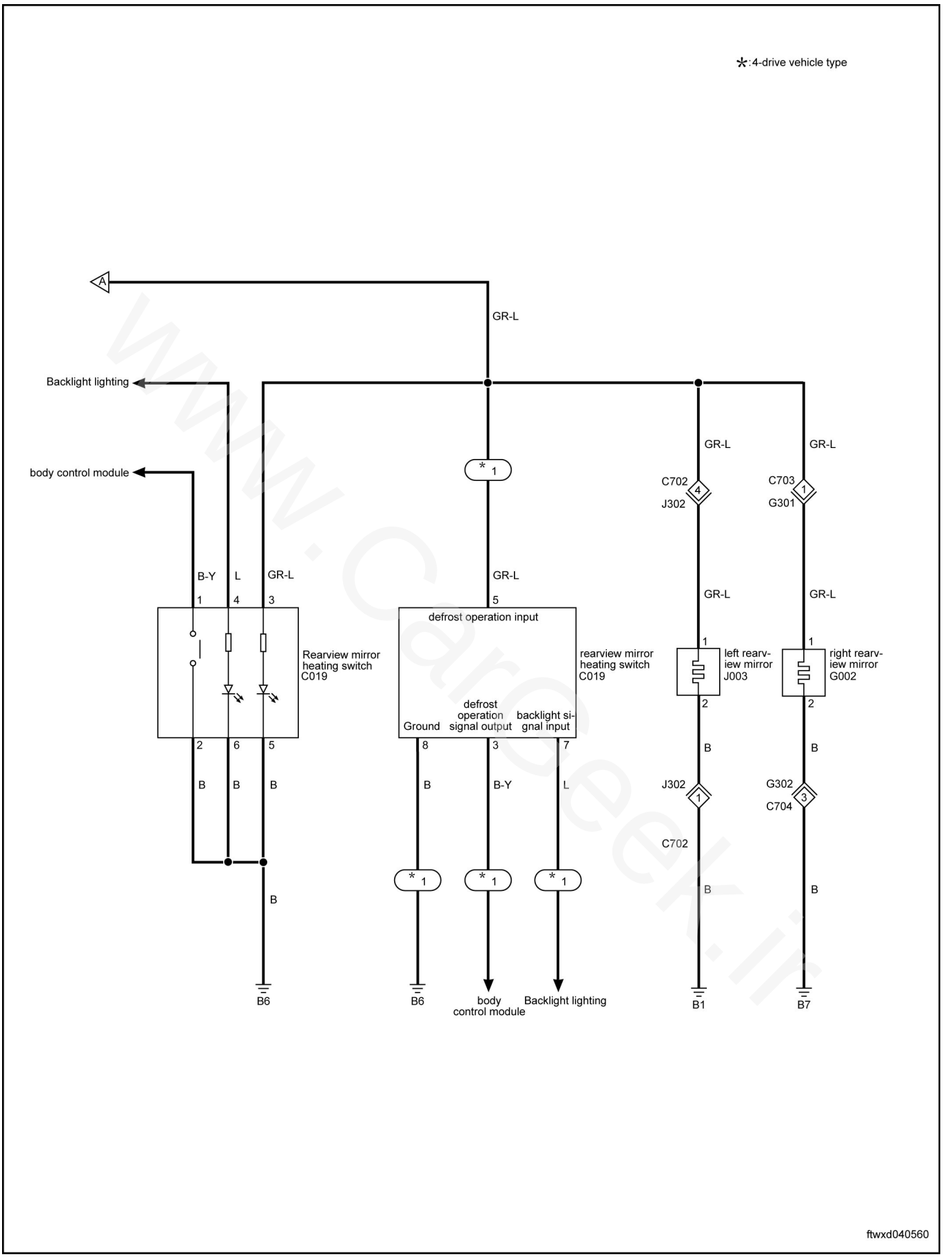
No > Maintenance or replace harness.

B 1391 DEFROST CONTROL CIRCUIT --OPEN CIRCUIT
B1392DEFROST CONTROL CIRCUIT --HIGH CURRENT

Circuit diagram



04



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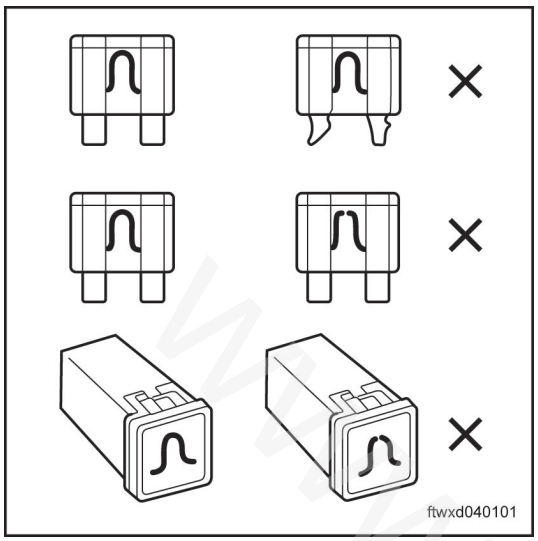
Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F39 (15 A) in the indoor fuse box.

Check whether the result is normal?

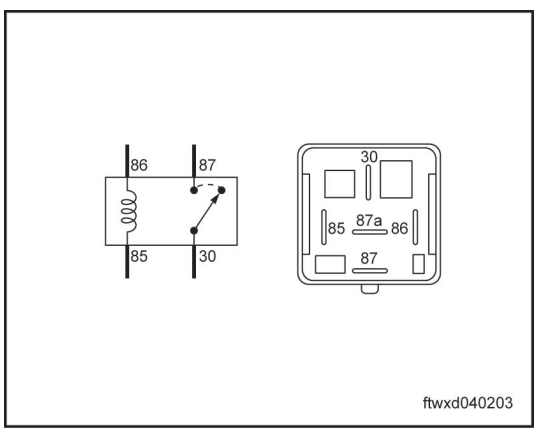
Yes> go to step 2

No> replace fuse

2 . Check rear windscreen defrost relay

(a) Ignition Switch: OFF.

(b) Pull out rear windscreen defrost relay



(c) Check rear windscreen defrost relay R1

Conditions	Multimeter connection stitch	Specified value
Normal situation	85-86	Breakover
Apply power supply voltage to position between stitches 85 and 86,	87-30	< 2 Ω

Check whether the result is normal?

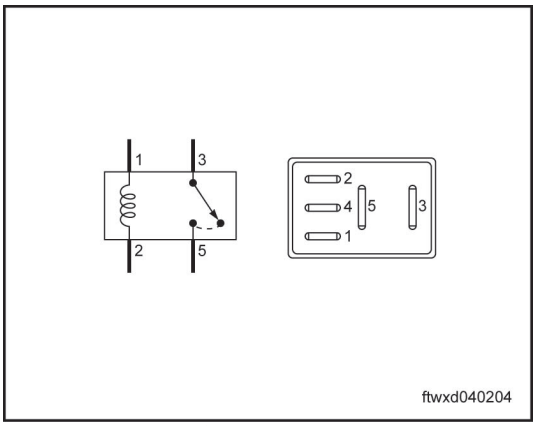
Yes> go to step 3

No> replace rear windscreen defrost relay

3 . Check rearview mirror heating relay

(a) Ignition Switch: OFF.

(b) Pull out rearview mirror heating relay R2.



(c) Check rearview mirror heating relay R2

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Normal situation	1-2	Breakover
Apply power supply voltage to position between stitches 1 and 2,	3-5	< 2 Ω

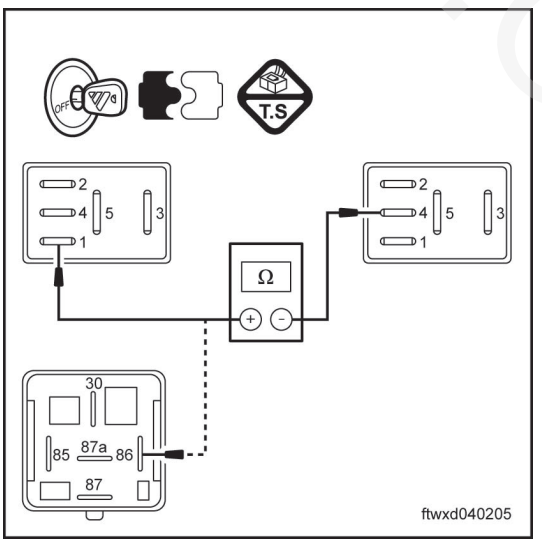
Check whether the result is normal?

Yes> go to step 4

No> replace rear windscreen heating relay

4 . Check harness and connector (rearview mirror heating relay—rear windscreen defrost relay)

(a) Ignition Switch: OFF.
(b) Pull out rearview mirror heating relay R2.
(c) Pull out rear windscreen defrost relay



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
R2(1)-R1(86)	< 2 Ω

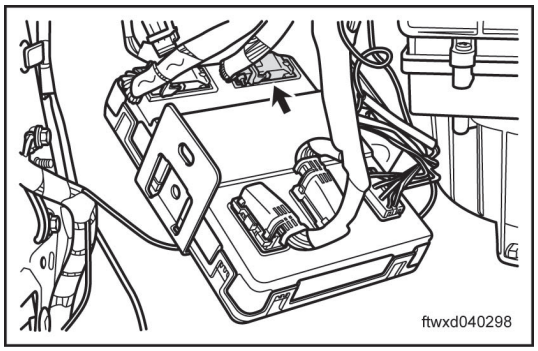
Check whether the result is normal?

Yes> go to step 5

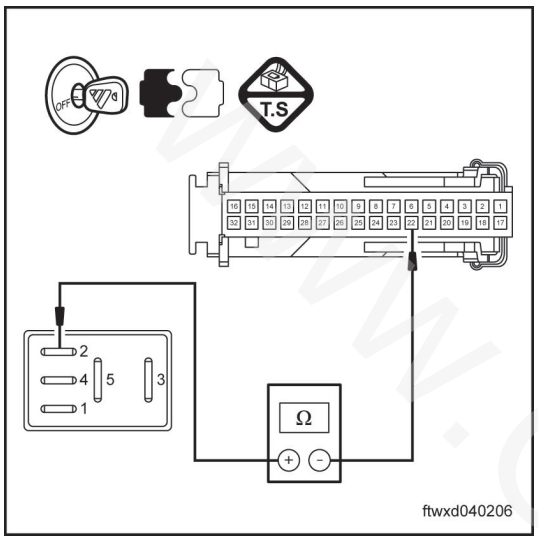
No > Maintenance or replace harness.

5 . Check harness and connector (rearview mirror heating relay—BCM control unit)

(a) Ignition Switch: OFF.
(b) Pull out rearview mirror heating relay R2.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
R2（2）- C035（D22）	＜ 2 Ω

Check whether the result is normal?

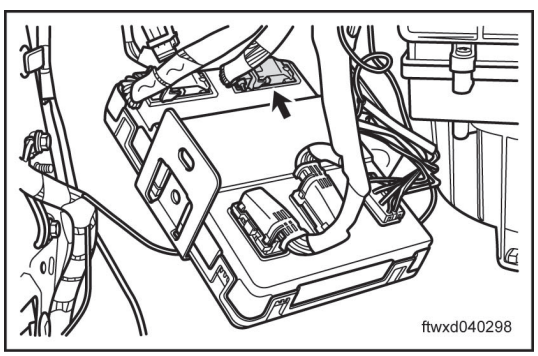
Yes> go to step 6

No > Maintenance or replace harness.

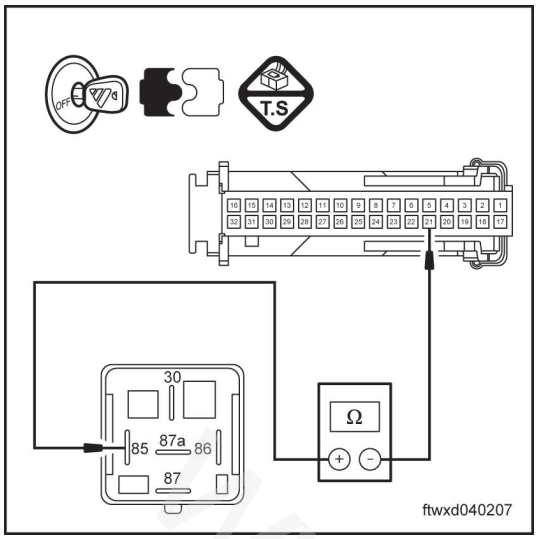
6 . Check harness and connector (rear windscreen defrost relay—BCM control unit)

(a) Ignition Switch: OFF.

(b) Pull out rear windscreen defrost relay



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
R1（85） - C035（D21）	＜ 2 Ω

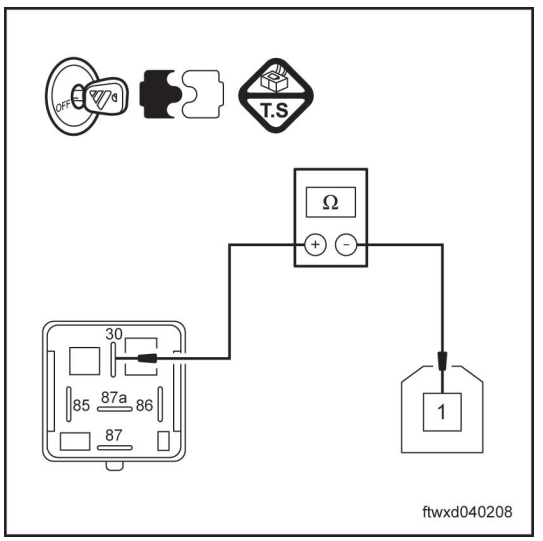
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

7 . Check harness and connector (rear windscreen defrost relay—rear windscreen defrost)

(a) Ignition Switch: OFF.
(b) Pull out rear windscreen defrost relay
(c) Disconnect connector D004 of rear windscreen defroster.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
R1（30）-D004（1）	＜ 2 Ω

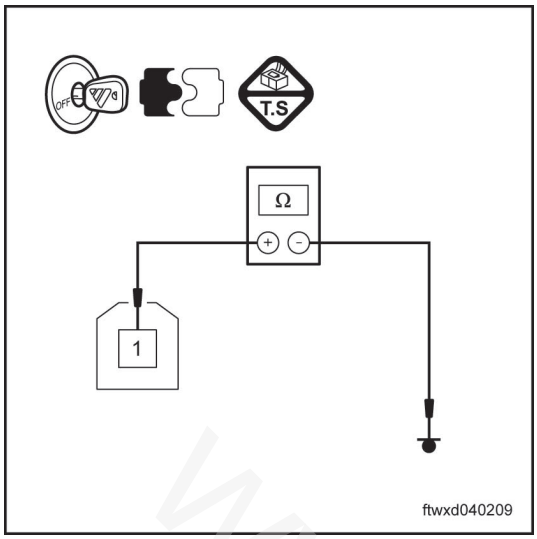
Check whether the result is normal?

Yes> go to step 8

No > Maintenance or replace harness.

8 . Check harness and connector (rear windscreen defrost--ground)

(a) Ignition Switch: OFF.
(b) Pull out rear windscreen defrost relay
(c) Disconnect connector D004 of rear windscreen defroster.



Check whether the result is normal?

Yes> replace rear windscreen defrost.

No > Maintenance or replace harness.

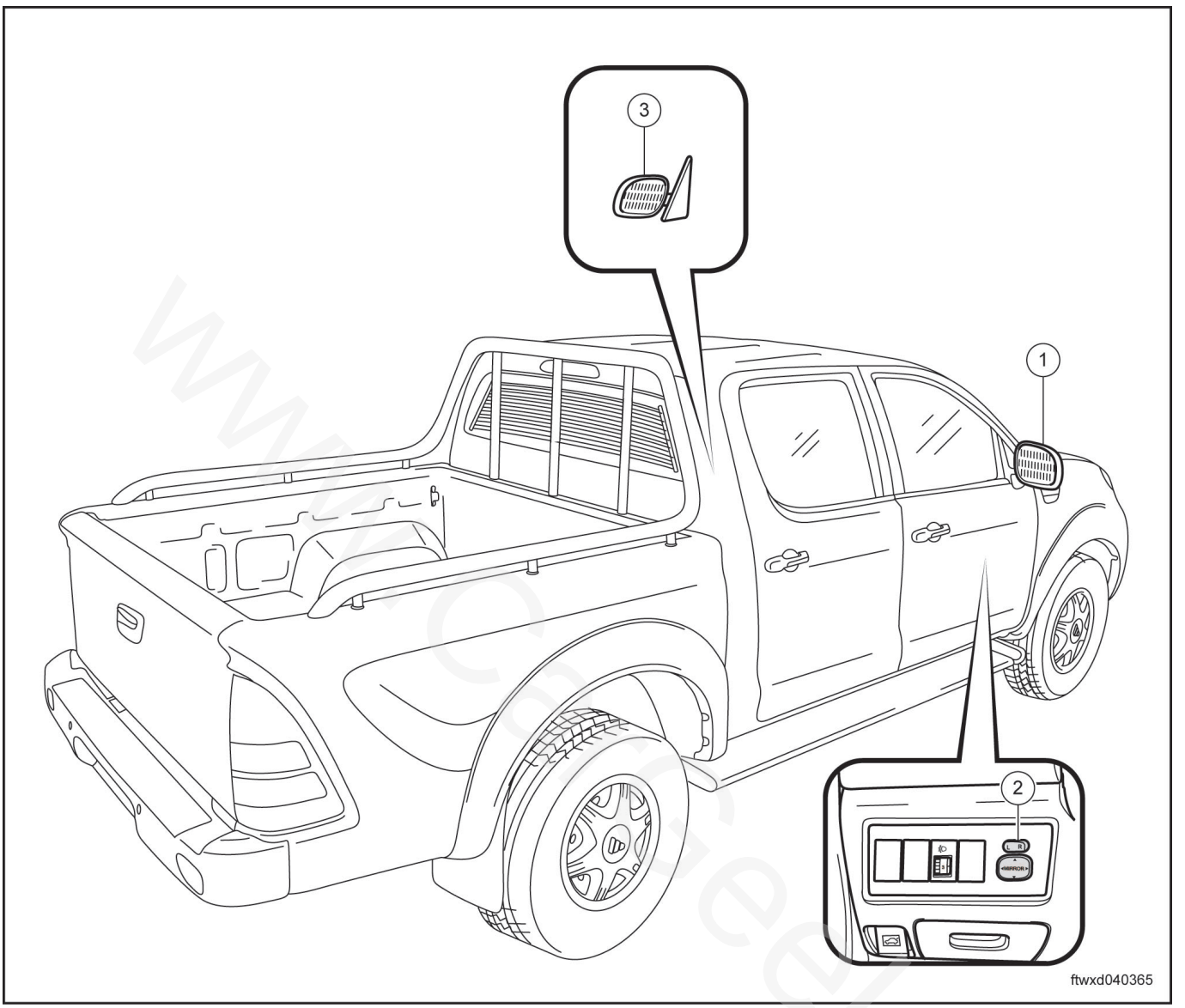
(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
D004 (1) ground	< 2 Ω

POWER REARVIEW MIRROR.

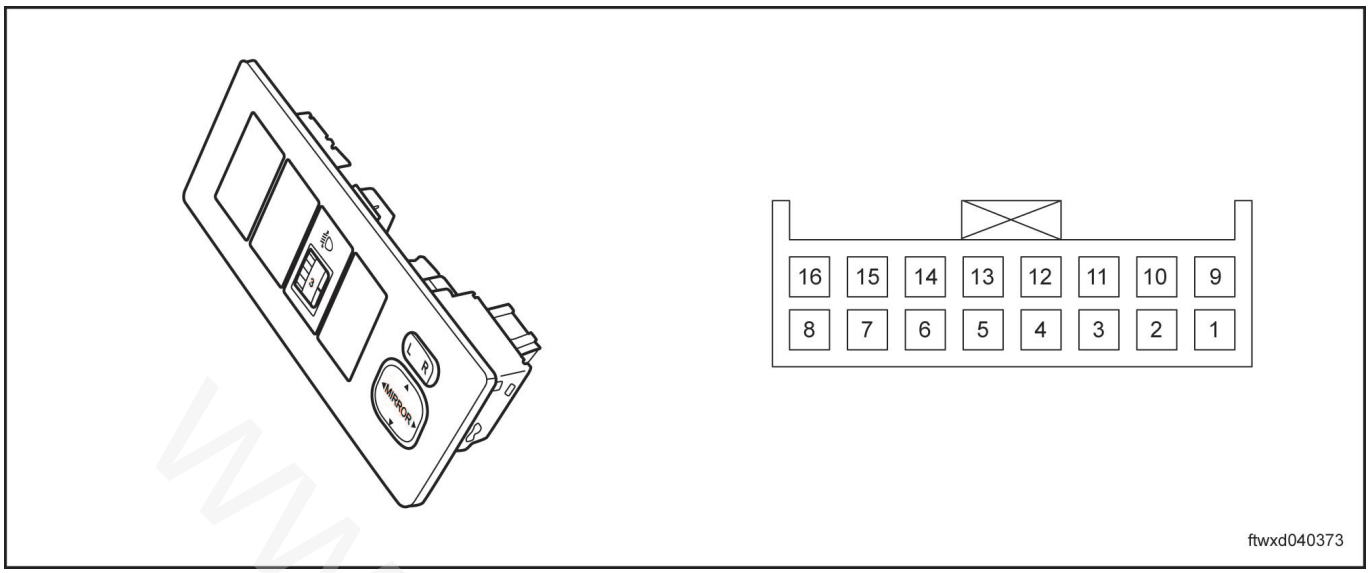
COMPONENTS DRAWING



1	Right rearview mirror assembly
2	Switch assembly, power rearview mirror

3	Left rearview mirror assembly

STITCH DESCRIPTION, POWER REARVIEW MIRROR SWITCH



Stitch number	Connection rod color	Description
1	Red	Power supply
2	Black	ground
3	Red-orange	Connect to left/right rearview mirror
4	-	-
5	Blue-red	Connect to left/right adjustment motor of left rearview mirror
6	Red-grey	Connect to upper/lower adjustment motor of left rearview mirror
7	Black-Red	Connect to upper/lower adjustment motor of right rearview mirror
8	Red-blue	Connect to left/right adjustment motor of right rearview mirror

BASIC INSPECTION

Steps	Inspection contents		Measures
1	Check Battery voltage • Battery voltage shall not be lower than 12V. Check whether the result is normal?	Yes	No> go to step 2
		No?	Charge or replace the battery. Refer to “Chapter 20, start and charge- battery”
2	Check switch adjustment situation, power rearview mirror • Ignition Switch: ON. • Adjust visible angle of left and right power rearview mirror respectively. Check whether the result is normal?	Yes	to Defect Phenomenon Form
		No?	Replace switch of power rearview mirror. (Refer to "Chapter 82. Windscreen/window glass/rearview mirror – power rearview mirror switch, replacement")

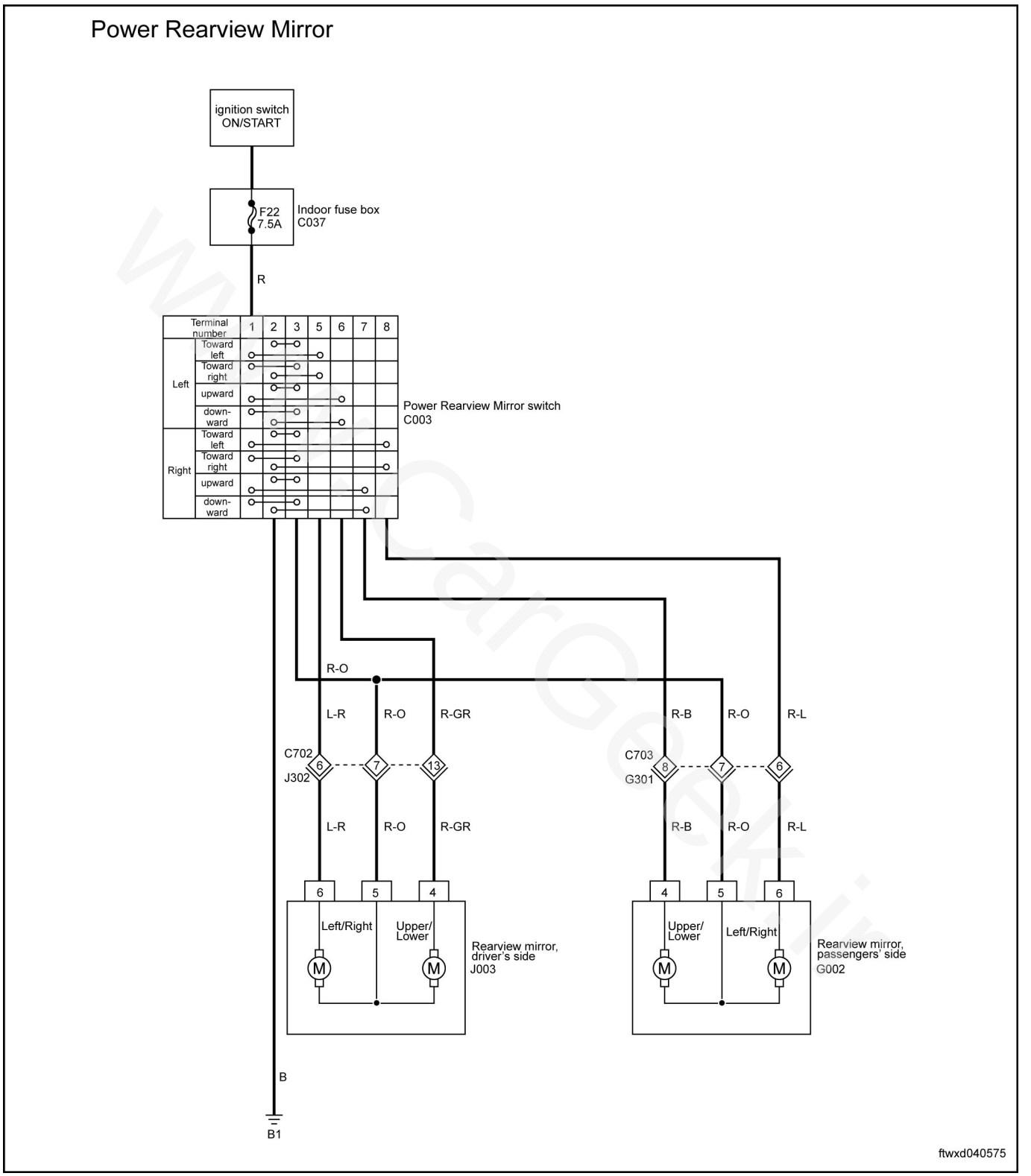
DEFECT PHENOMENON FORM

Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Defect phenomenon	Suspect Area	Suspect Area
Power rearview mirror on both sides don’t work at all.	1. Fuse	-
	2. Switch, power rearview mirror.	Chapter 85 Lock-- front door lock, replacement
	3. Harness	-
Power rearview mirror on one side don’t work at all.	1. Switch, power rearview mirror.	Chapter 85 Lock-- front door lock, replacement
	2. Power rearview mirror.	Chapter 82. Windscreen/window glass/rearview mirror - rearview mirror, replacement
	3. Harness	-
, Upper and lower adjustment of power rearview mirror doesn’t work	1. Switch, power rearview mirror.	Chapter 85 Lock-- front door lock, replacement
	2. Rearview mirror motor	Chapter 85 Lock-- front door lock, replacement
	3. Harness	-
, Left/right adjustment of power rearview mirror doesn’t work	1. Switch, power rearview mirror.	Chapter 85 Lock-- front door lock, replacement
	2. Rearview mirror motor	Chapter 82. Windscreen/window glass/rearview mirror - rearview mirror, replacement
	3. Harness	-
Heating power rearview mirror doesn't work	1. Switch, power rearview mirror.	Chapter 85 Lock-- front door lock, replacement
	2. Heating wires of power rearview mirror	Chapter 82. Windscreen/window glass/rearview mirror - rearview mirror, replacement
	3. Harness	-

UPPER AND LOWER ADJUSTMENT OF POWER REARVIEW MIRROR DOESN’T WORK

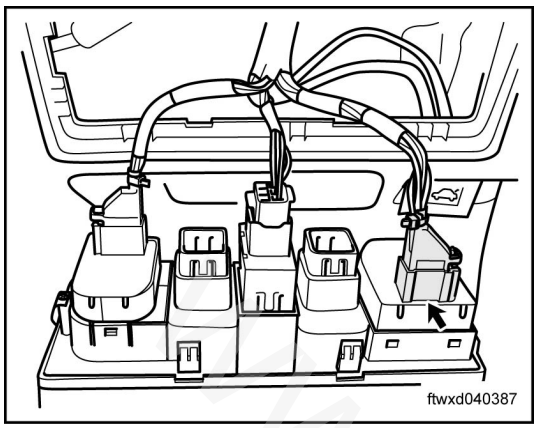
Circuit diagram



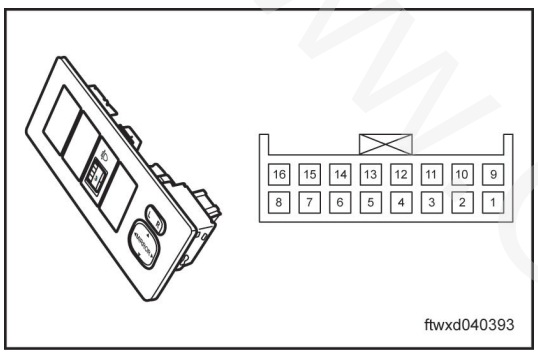
Diagnostic steps

1 . Check the switch of power rearview mirror

(a) Ignition Switch: OFF.



(b) Disconnect switch connector C003 of power rearview mirror



(c) Use multimeter to check the switch of power rearview mirror.

Standard resistance:

Function	Operation	Multimeter connection stitch	Specified value
Left rearview mirror	Upper	1 - 6	< 2 Ω
		2 - 3	
	Lower	1 - 3	
		2 - 6	

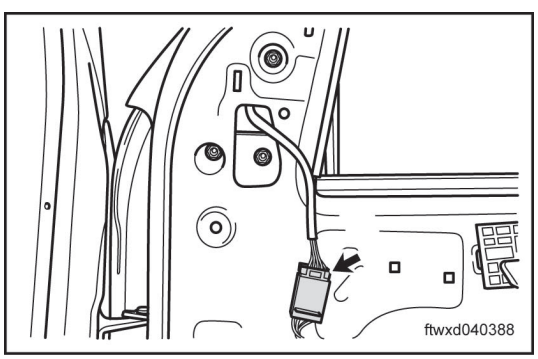
Check whether the result is normal?

Yes> go to next step.

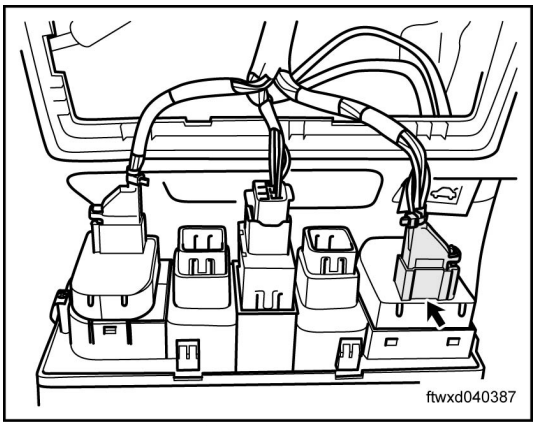
No> Replace switch assembly of power rearview mirror.

2 . Check harness and connector (power rearview mirror switch-left rearview mirror)

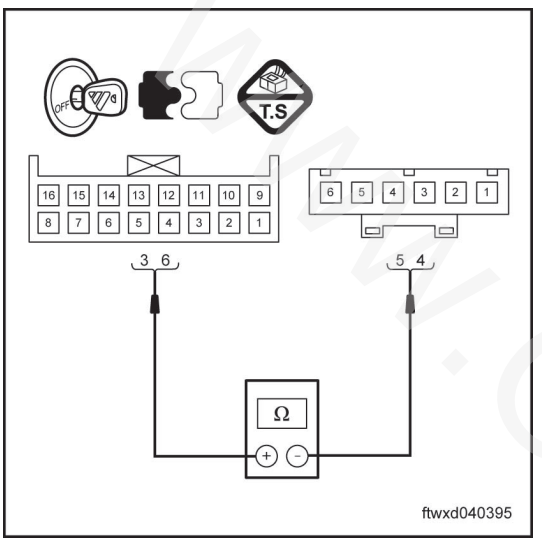
(a) Ignition Switch: OFF.



(b) Disconnect left power rearview mirror connector J003.



(c) Disconnect switch connector C003 of power rearview mirror



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C003 (6) - J003 (4)	< 2 Ω
C003 (3) - J003 (5)	

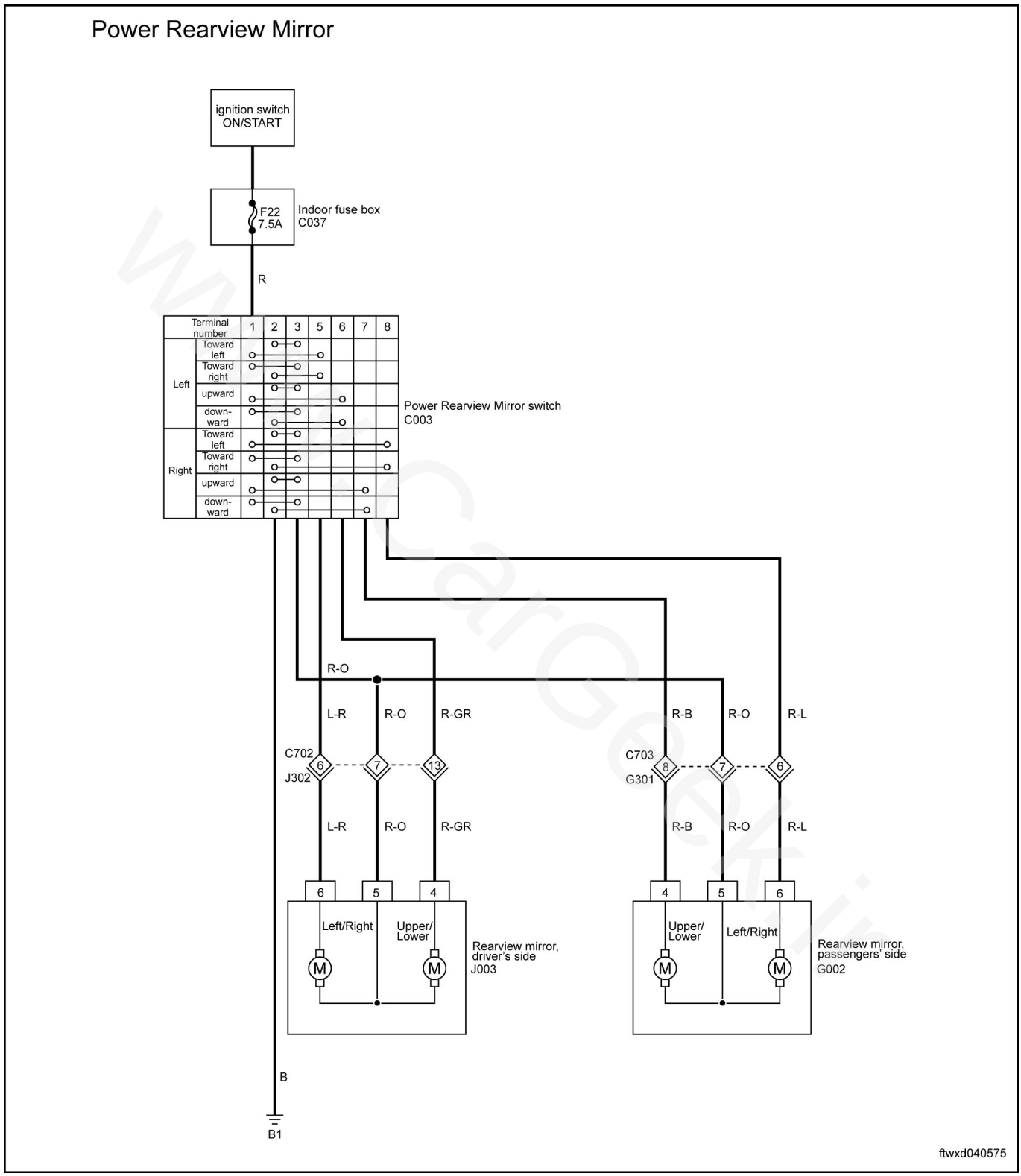
Check whether the result is normal?

Yes> replace left rearview mirror assembly.

No > Maintenance or replace harness.

LEFT/RIGHT ADJUSTMENT OF POWER REARVIEW MIRROR DOESN’T WORK

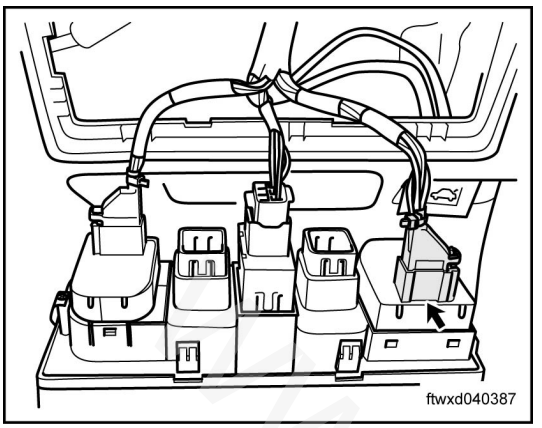
Circuit diagram



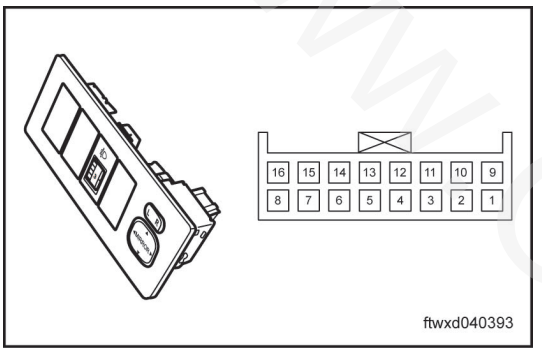
Diagnostic steps

1 . Check the switch of power rearview mirror

(a) Ignition Switch: OFF.



(b) Disconnect switch connector C003 of power rearview mirror



(c) Use multimeter to check the switch of power rearview mirror.

Standard resistance:

Function	Operation	Multimeter connection stitch	Specified value
Left rearview mirror	Left	1 - 5	< 2 Ω
		2 - 3	
	Right	2 - 5	
		1 - 3	

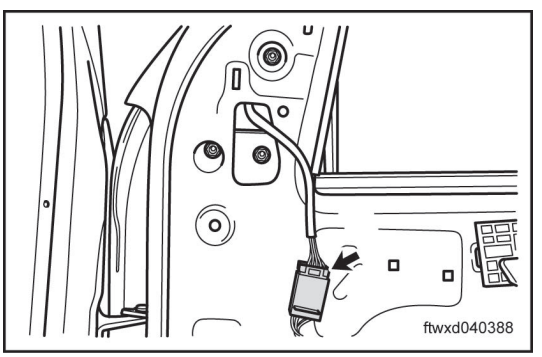
Check whether the result is normal?

Yes> go to next step.

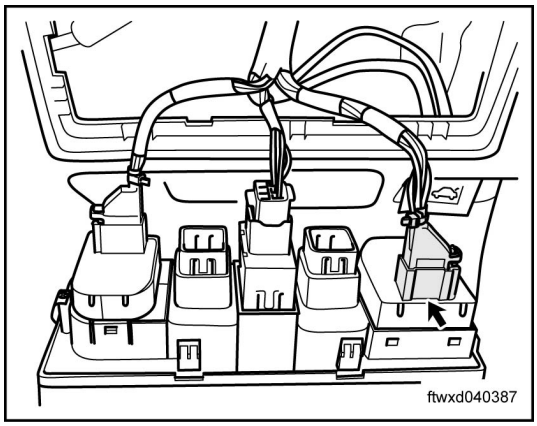
No> Replace switch assembly of power rearview mirror.

2 . Check harness and connector (power rearview mirror switch-left rearview mirror)

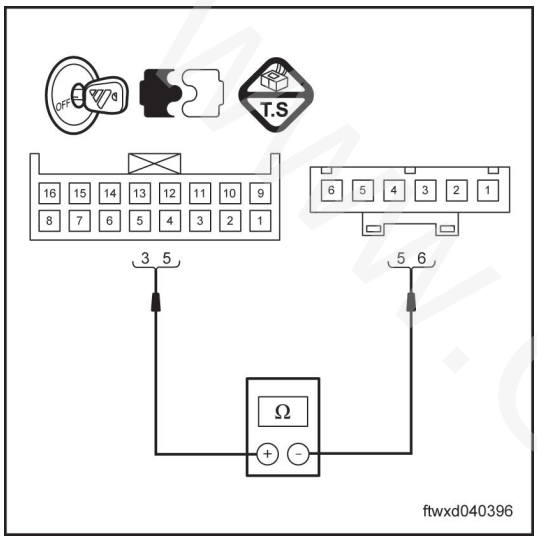
(a) Ignition Switch: OFF.



(b) Disconnect left power rearview mirror connector J003.



(c) Disconnect switch connector C003 of power rearview mirror



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C003 (5) - J003 (6)	< 2 Ω
C003 (3) - J003 (5)	

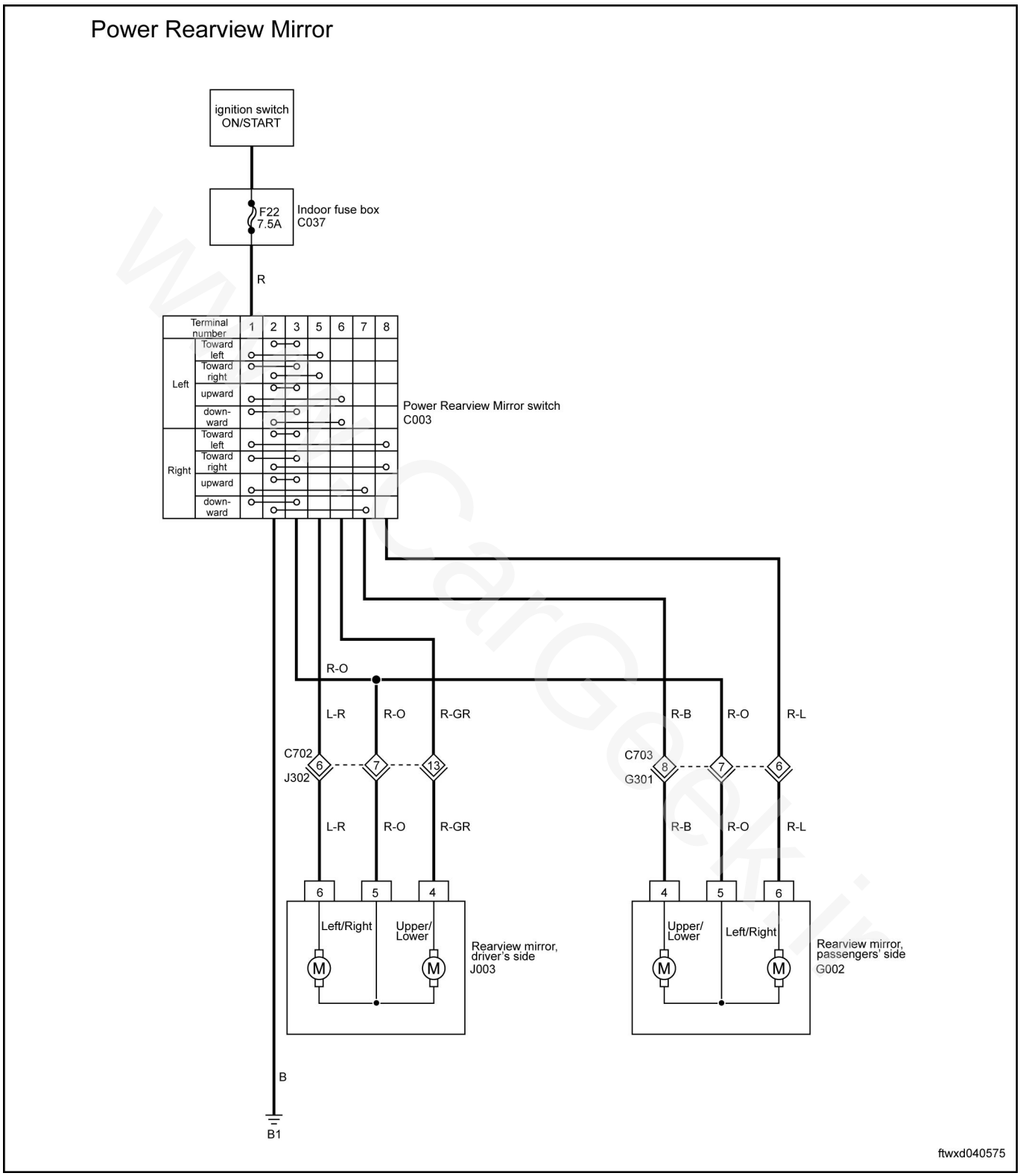
Check whether the result is normal?

Yes> replace power rearview mirror assembly.

No > Maintenance or replace harness.

POWER REARVIEW MIRROR ON BOTH SIDES DON’T WORK AT ALL.

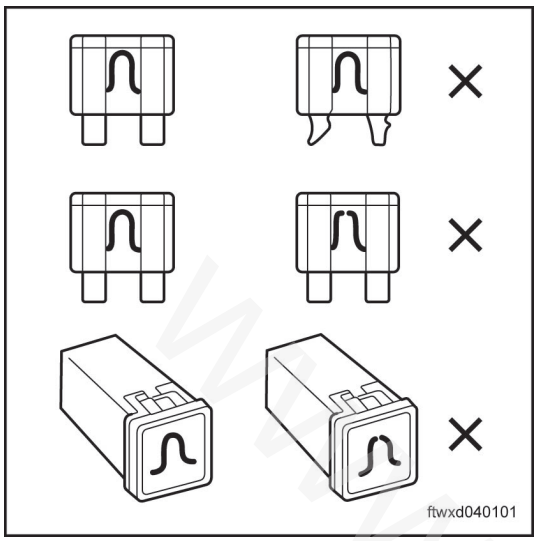
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check fuse : F22 (7.5A). inside fuse box(C037) of the body

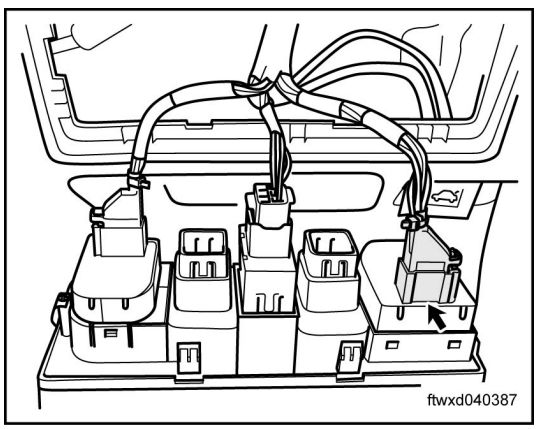
Check whether the result is normal?

Yes> go to step 3

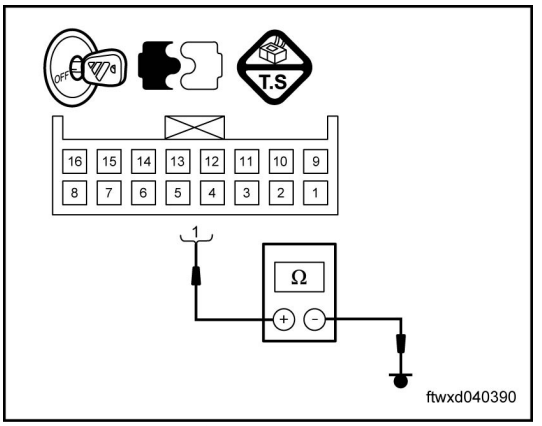
No> go to next step.

2 . Check harness and connector (power rearview mirror switch-ground)

(a) Ignition Switch: OFF.



(b) Disconnect switch connector C003 of power rearview mirror



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C003 (1) ground	⩾1 MΩ

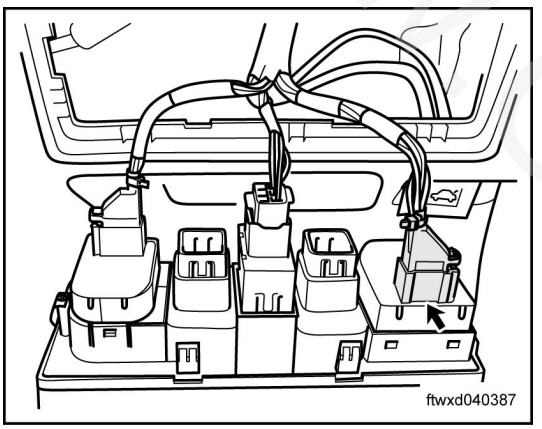
Check whether the result is normal?

Yes> Replace fuse

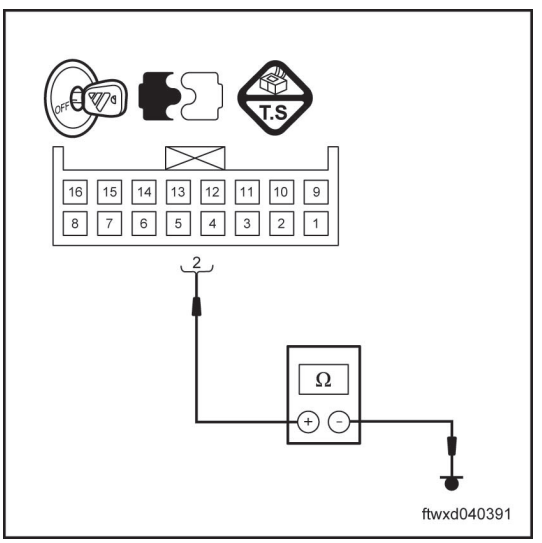
No > Maintenance or replace harness.

3 . Check harness and connector (power rearview mirror switch-left rearview mirror)

(a) Ignition Switch: OFF.



(b) Disconnect switch connector C003 of power rearview mirror



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C003 (2) ground	< 2 Ω

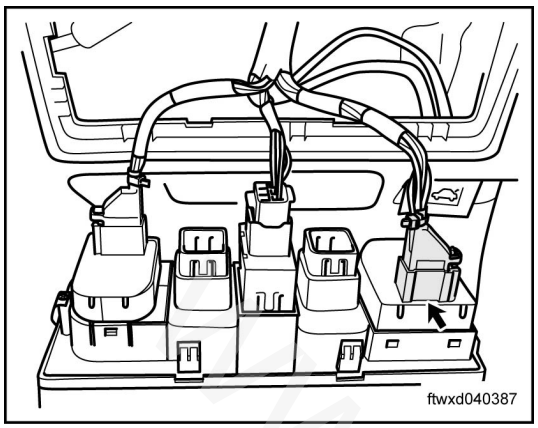
Check whether the result is normal?

Yes> go to next step.

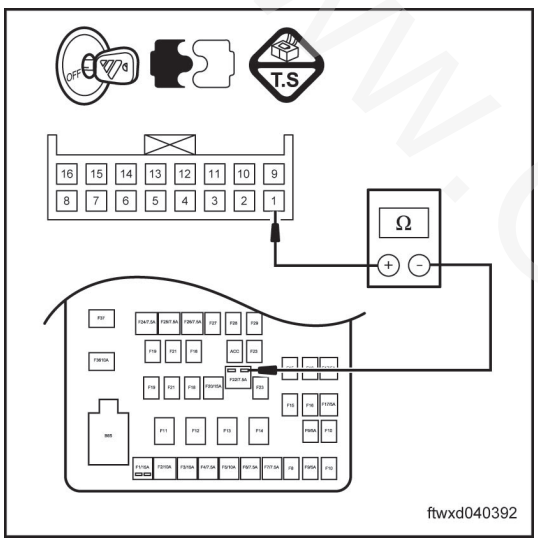
No > Maintenance or replace harness.

4 . Check harness and connector (power rearview mirror switch-fuse, power rearview mirror)

(a) Ignition Switch: OFF.



(b) Disconnect switch connector C003 of power rearview mirror



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F22（7.5A） - C003 (1）	＜ 2 Ω

Check whether the result is normal?

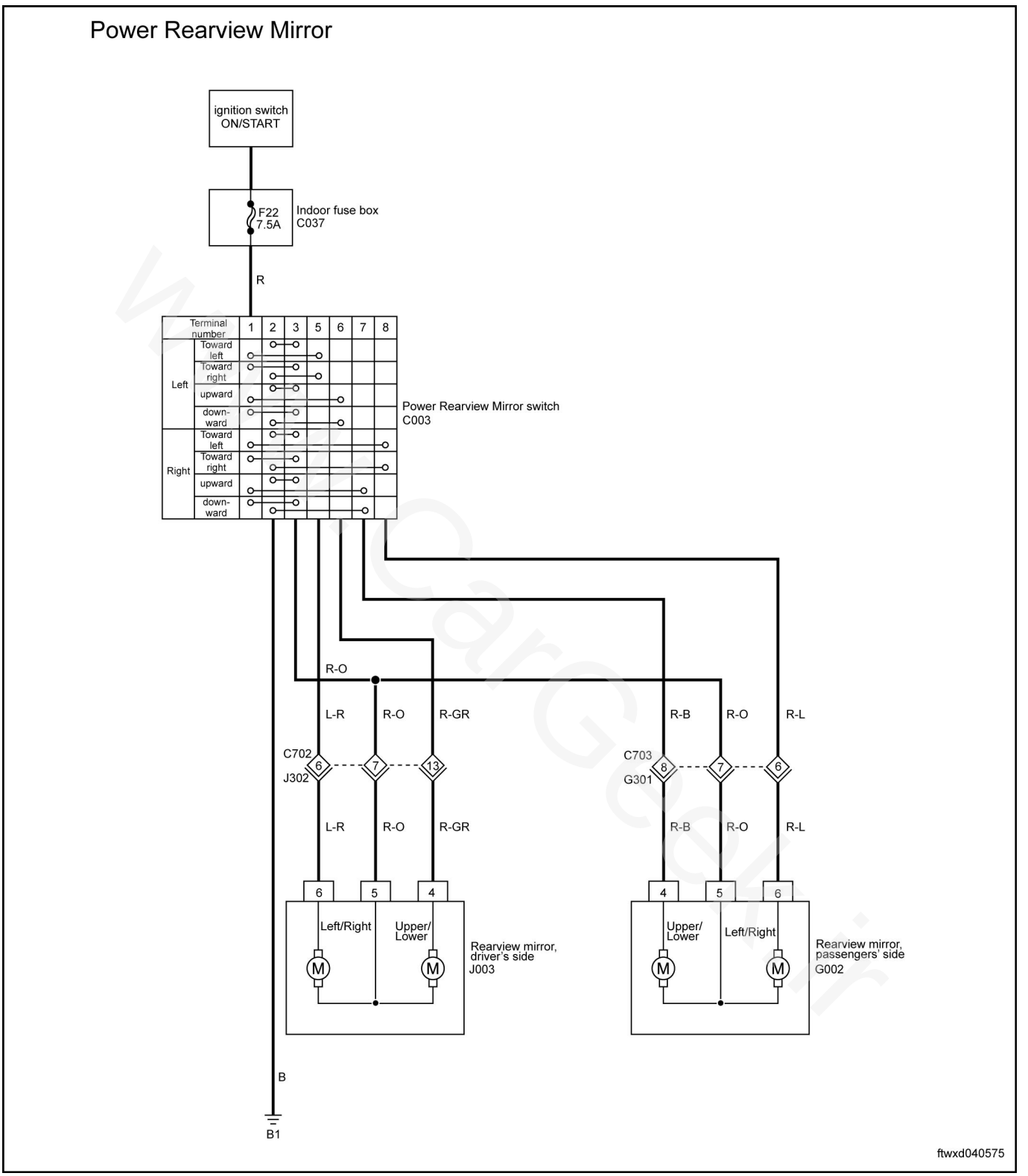
Yes>Replace switch, power rearview mirror.

No > Maintenance or replace harness.

POWER REARVIEW MIRROR ON ONE SIDE DON’T WORK AT ALL.

Circuit diagram

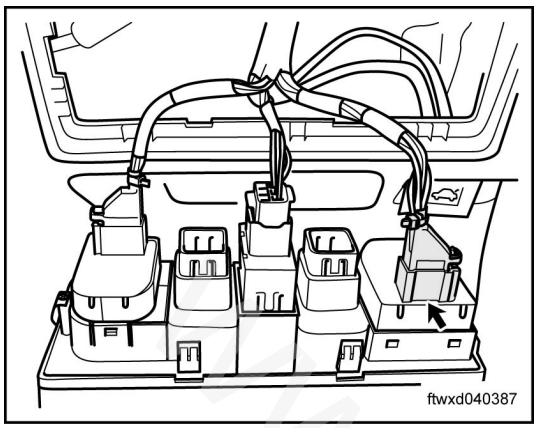
Power Rearview Mirror



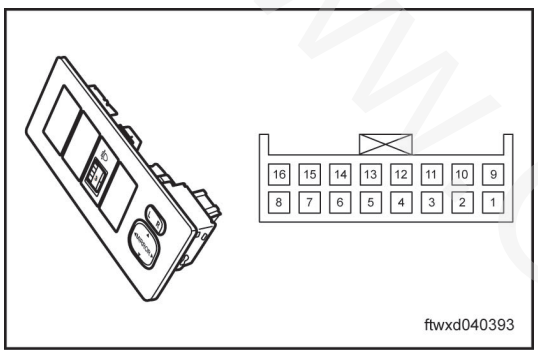
Diagnostic steps

1 . Check the switch of power rearview mirror

(a) Ignition Switch: OFF.



(b) Disconnect switch connector C003 of power rearview mirror



(c) Use multimeter to check the switch of power rearview mirror.

Function	Operation	Multimeter connection stitch	Specified value
Left rearview mirror	Left	1 - 5	< 2 Ω
		2 - 3	
	Right	2 - 5	
		1 - 3	
	Upper	1 - 6	
		2 - 3	
	Lower	2 - 6	
		1 - 3	

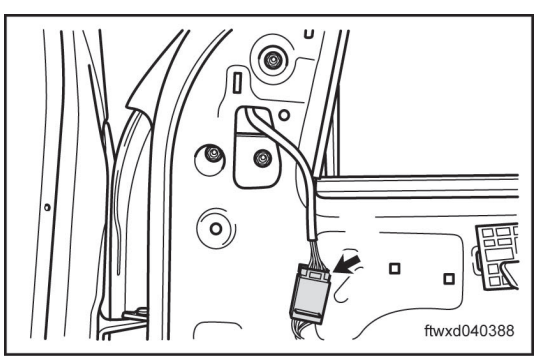
Check whether the result is normal?

Yes> go to next step.

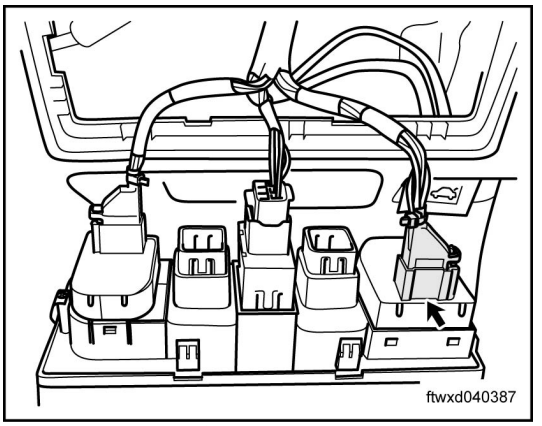
No> Replace switch assembly of power rearview mirror.

2 . Check harness and connector (power rearview mirror switch-left rearview mirror)

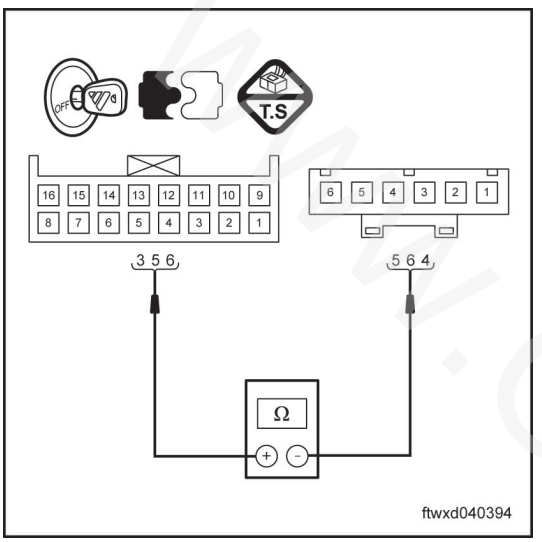
(a) Ignition Switch: OFF.



(b) Disconnect left power rearview mirror connector J003.



(c) Disconnect switch connector C003 of power rearview mirror



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C003 (6) - J003 (4)	＜ 2 Ω
C003 (3） - J003 (5)	
C003 (5) - J003 (6)	

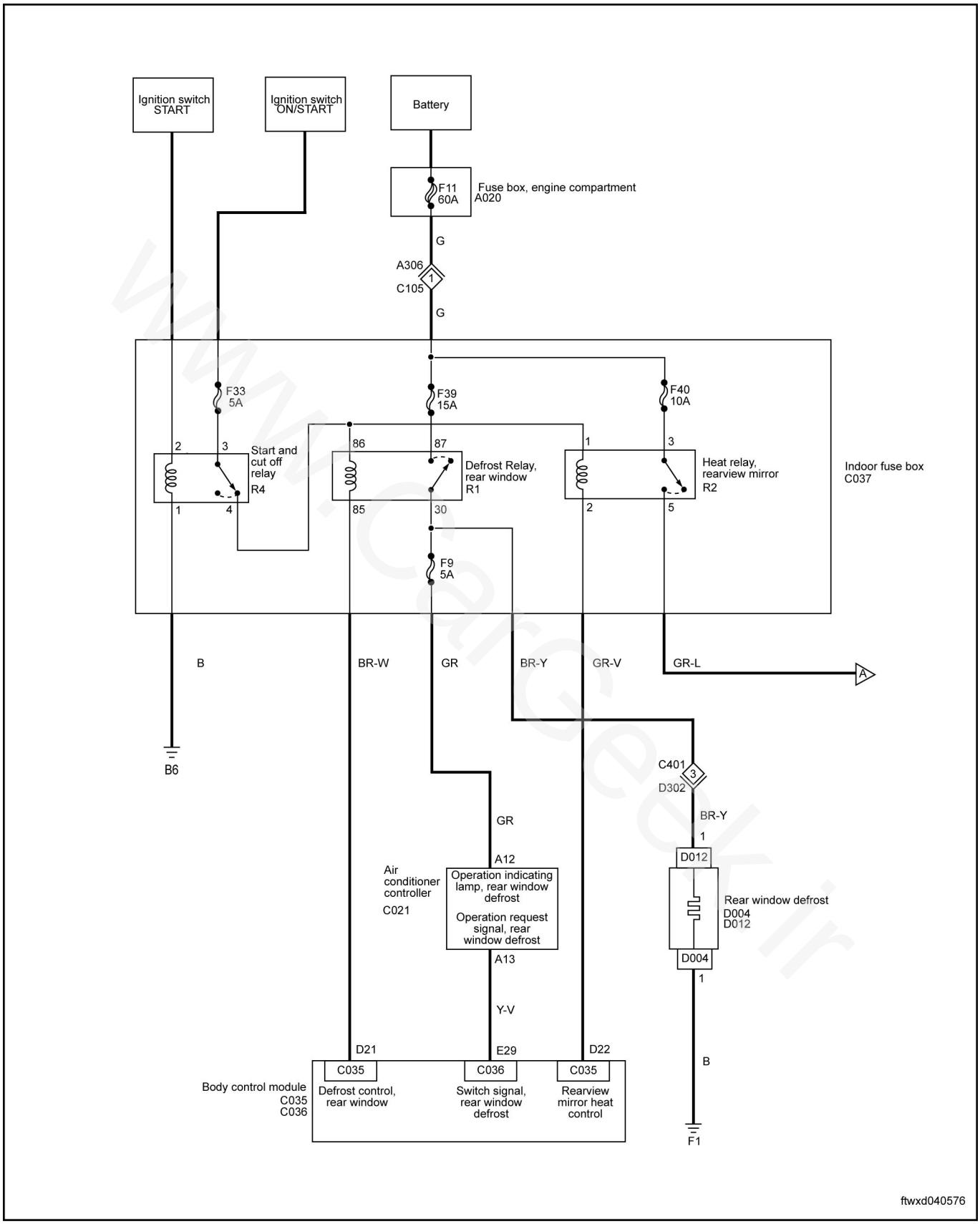
Check whether the result is normal?

Yes> replace power rearview mirror assembly.

No > Maintenance or replace harness.

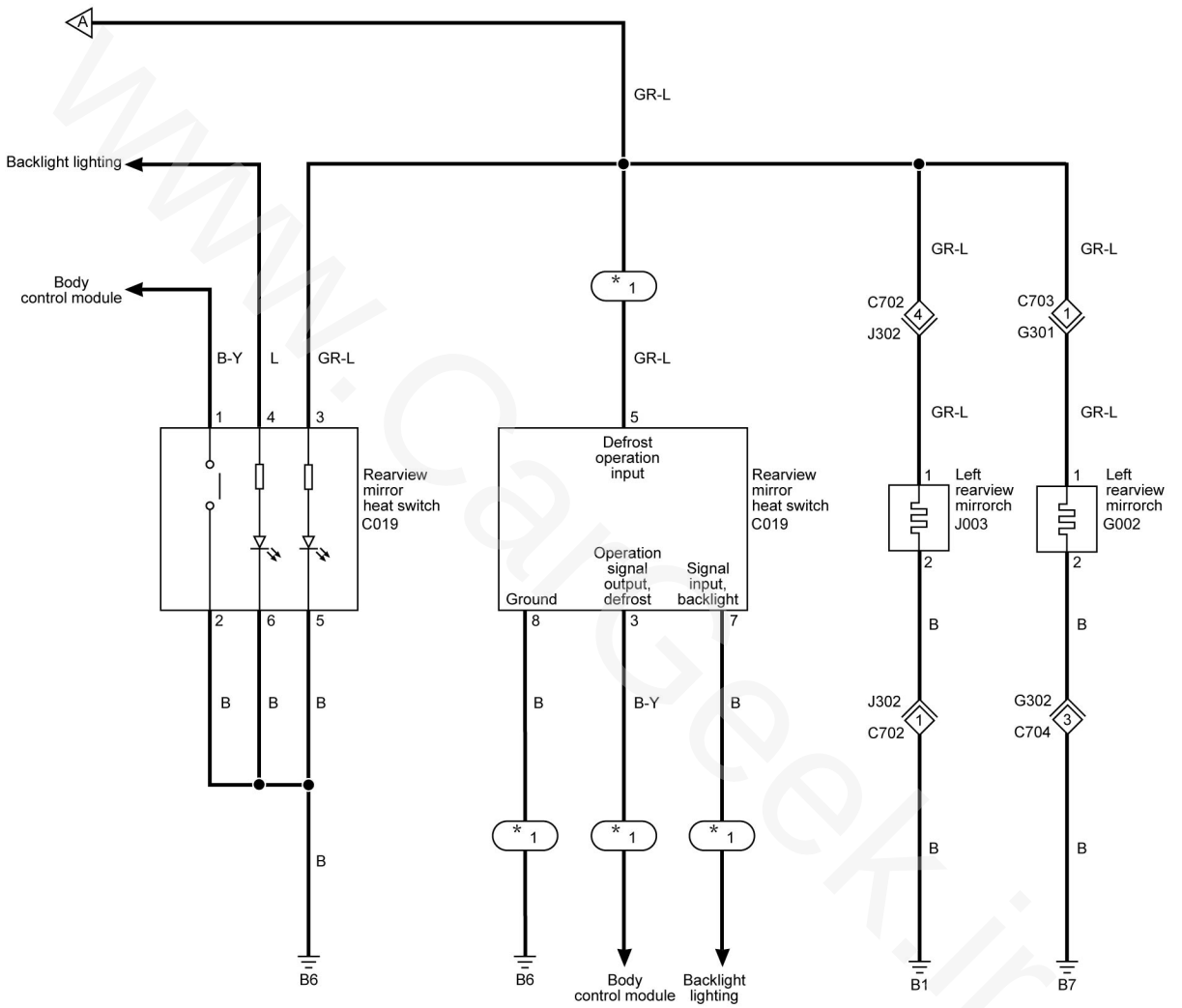
HEATING POWER REARVIEW MIRROR DOESN'T WORK

Circuit diagram



04

*: Four-wheeled vehicle type

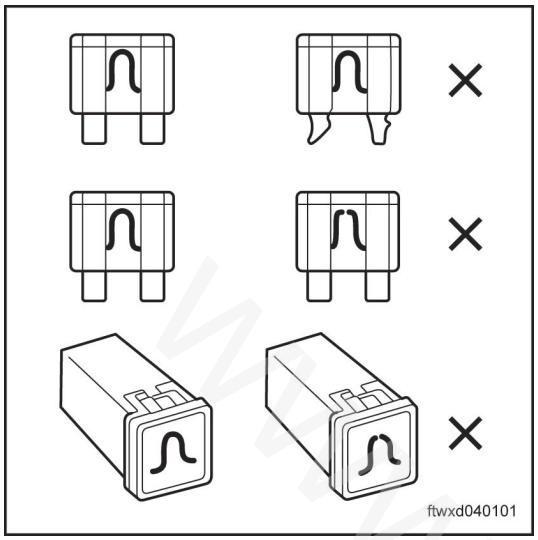


ftwxd040611

Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check fuse : F11 (60A).inside fuse box, engine compartment

(c) Check fuse: F40 (10A). inside fuse box of the body

Check whether the result is normal?

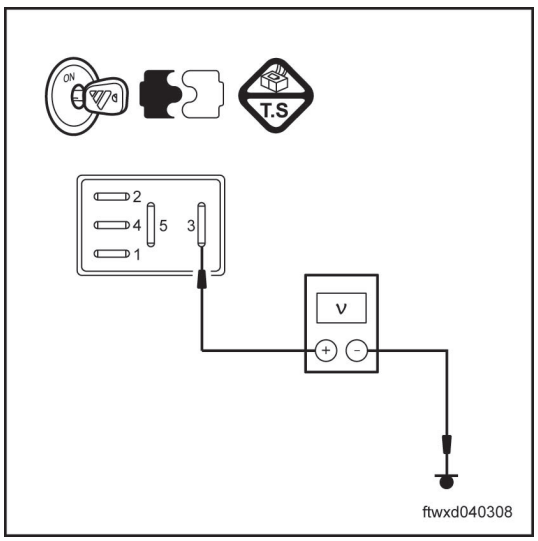
Yes> go to step 4

No> replace fuse

2 . Check harness and connector (rearview mirror heating relay-ground)

(a) Ignition Switch: ON.

(b) Pull out rearview mirror heating relay R2 inside fuse box of the body.



(c) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Multimeter connection
R2(3) ground	Battery voltage

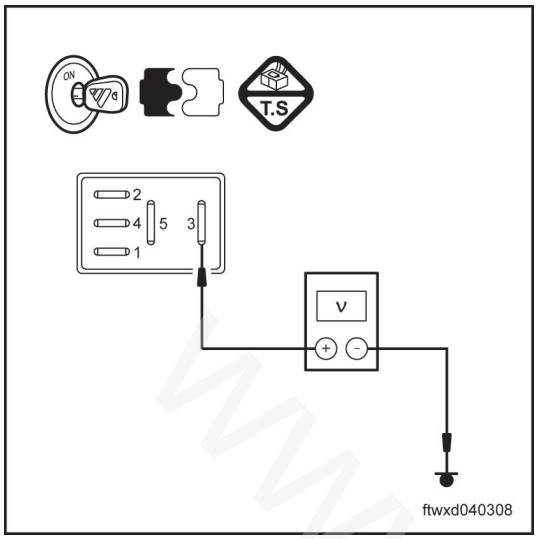
Check whether the result is normal?

Yes> go to step 3

No > Maintenance or replace harness.

3 . Check harness and connector (start and cut-off relay--ground)

(a) Ignition Switch: ON.
(b) Pull out start and cut-off relay R4 inside fuse box of body.



(c) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Multimeter connection
R4(3) ground	Battery voltage

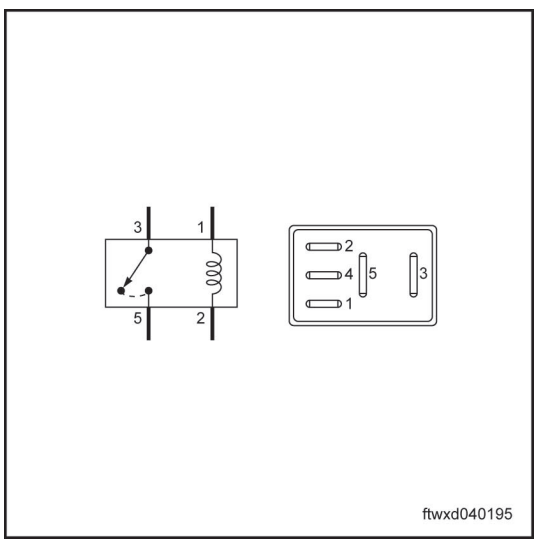
Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

4 . Check the relay

(a) Disconnect battery negative cable.
(b) Pull out rearview mirror heating relay R2 inside fuse box of the body.

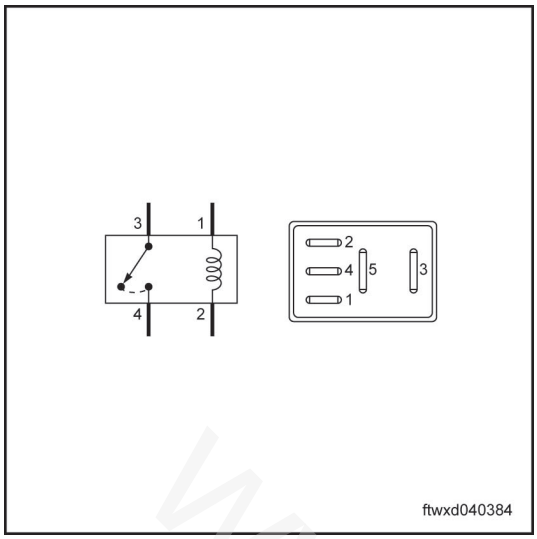


(c) Check rearview mirror heating relay R2

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitch 1 and 2,	3 - 5	＜ 2 Ω

(d) Pull out start and cut-off relay R4 inside fuse box of body.



(e) Check start and cut-off relay R4

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitch 1 and 2,	3 - 4	Cut-off

Check whether the result is normal?

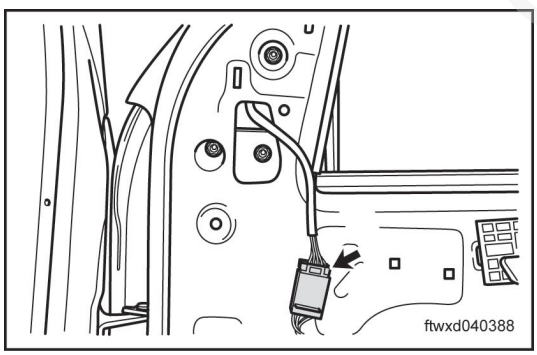
Yes> go to step 5

No>Replace relay

5 . Check harness and connector (rearview mirror heating relay—body controller)

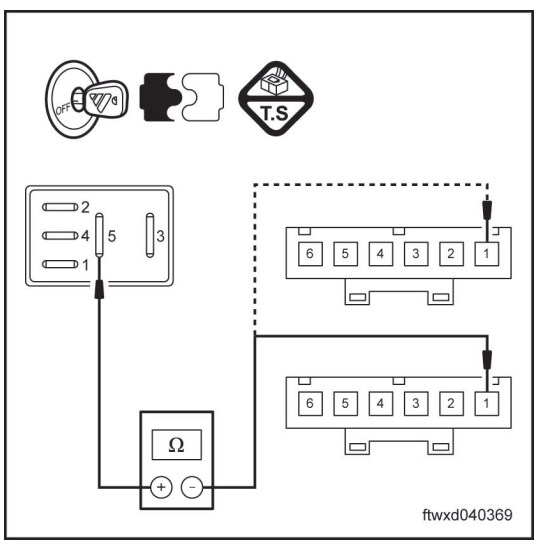
(a) Disconnect battery negative cable.

(b) Pull out rearview mirror heating relay R2 inside fuse box of the body.



(c) Disconnect left power rearview mirror connector J003.

(d) Disconnect right power rearview mirror connector G002.



(e) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
J003 (1） - R2(5)	＜2 Ω
D012 (1） - R2(5)	＜2 Ω

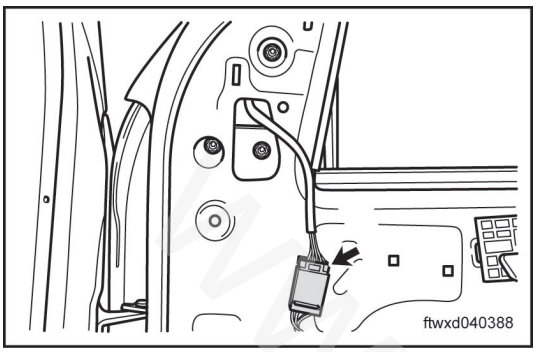
Check whether the result is normal?

Yes> go to step 6

No > Maintenance or replace harness.

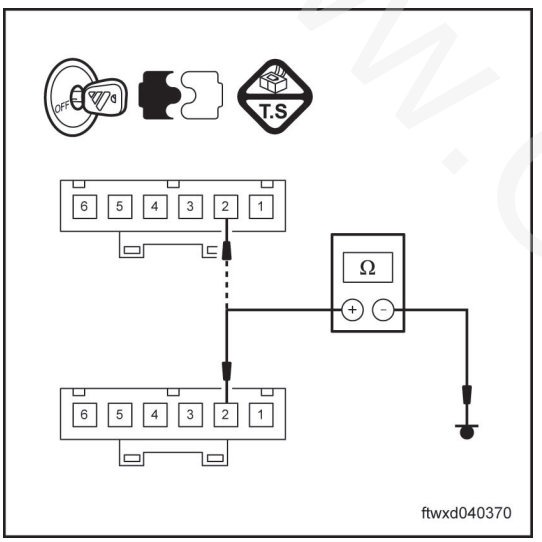
6 . Check harness and connector (rearview mirror--ground)

(a) Ignition Switch: ON.



(b) Disconnect left power rearview mirror connector J003.

(c) Disconnect right power rearview mirror connector G002.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
G002 (2) ground	< 2 Ω
J003 (2) ground	< 2 Ω

Check whether the result is normal?

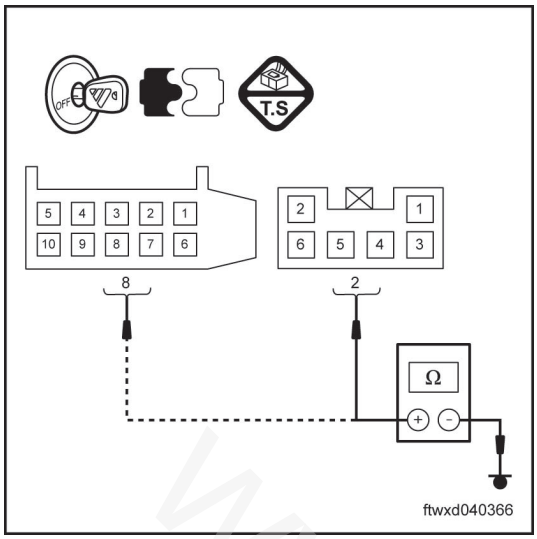
Yes> go to step 7

No > Maintenance or replace harness.

7 . Check harness and connector (rearview mirror heating switch--ground)

(a) Ignition Switch: ON.

(b) Disconnect the connector C019, rearview mirror heating switch



(c) Measure the electrical resistance based on the value in the following form.

4-drive vehicle type

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C019 (8) ground	< 2 Ω

2-drive vehicle type

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C019 (2) ground	< 2 Ω

Check whether the result is normal?

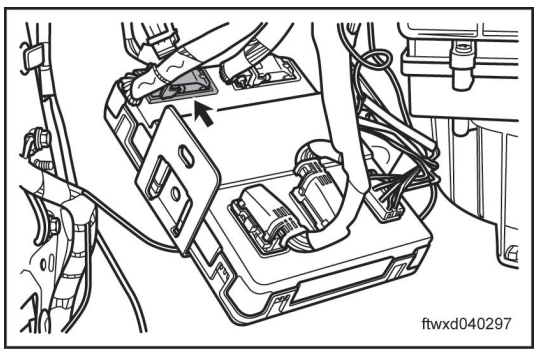
Yes> go to step 8

No > Maintenance or replace harness.

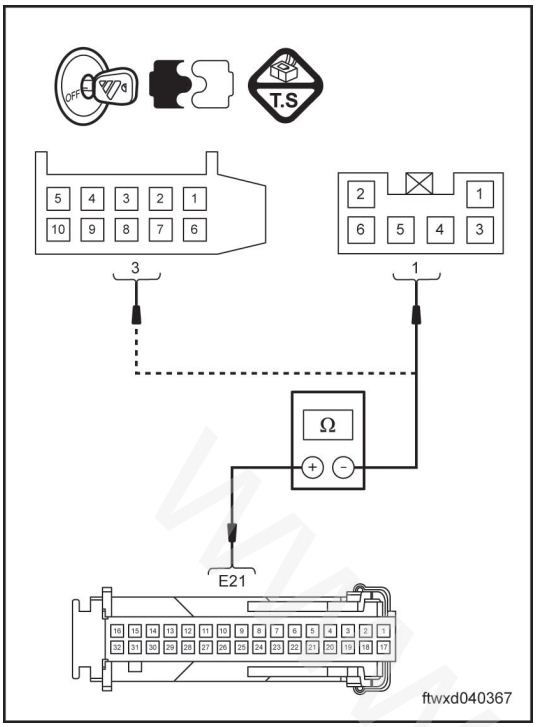
8 . Check harness and connector (rearview mirror heating switch—body controller)

(a) Disconnect battery negative cable.

(b) Disconnect the connector C019, rearview mirror heating switch



(c) Disconnect connector C036, body controller



(d) Measure the electrical resistance based on the value in the following form.

4-drive vehicle type

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C019 (3） - C036(E21)	＜2 Ω

2-drive vehicle type

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C019 (1） - C036(E21)	＜2 Ω

Check whether the result is normal?

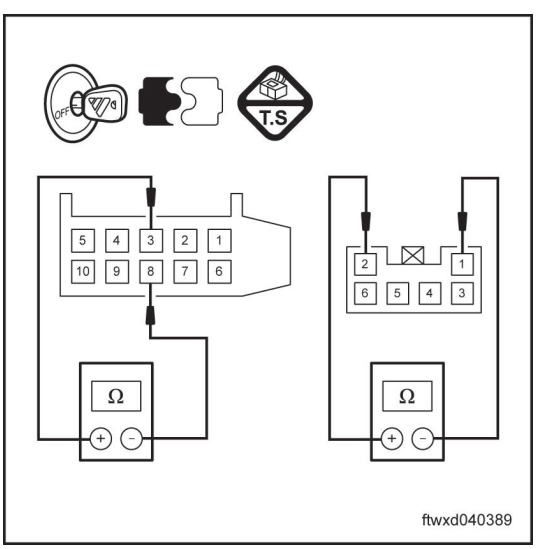
Yes> go to step 9

No > Maintenance or replace harness.

9 . Check rearview heating switch

(a) Ignition Switch: ON.

(b) Disconnect the connector C019, rearview mirror heating switch



(c) Measure the electrical resistance based on the value in the following form.

4-drive vehicle type

Standard resistance (check whether there is short circuit)

Multimeter connection	Conditions	Standard value
C019 (3） - C019(8)	Turn on the rearview mirror heating switch	＜2 Ω

2-drive vehicle type

Standard resistance (check whether there is short circuit)

Multimeter connection	Conditions	Standard value
C019 (1） - C019(2)	Turn on the rearview mirror heating switch	＜2 Ω

Check whether the result is normal?

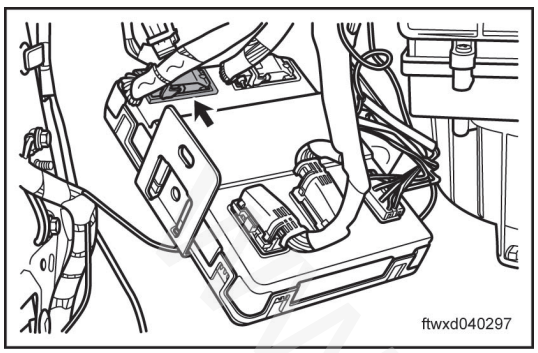
Yes> go to step 10

No> replace rearview mirror heating switch.

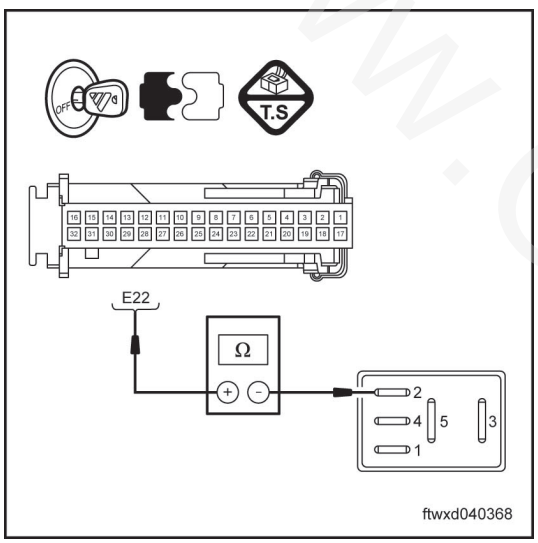
10 . Check harness and connector (rearview mirror heating relay—body controller)

(a) Disconnect battery negative cable.

(b) Pull out rearview mirror heating relay R2 inside fuse box of the body.



(c) Disconnect connector C036, body controller



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C036 (E22） - R2(2)	＜ 2 Ω

Check whether the result is normal?

Yes> replace body controller

No > Maintenance or replace harness.

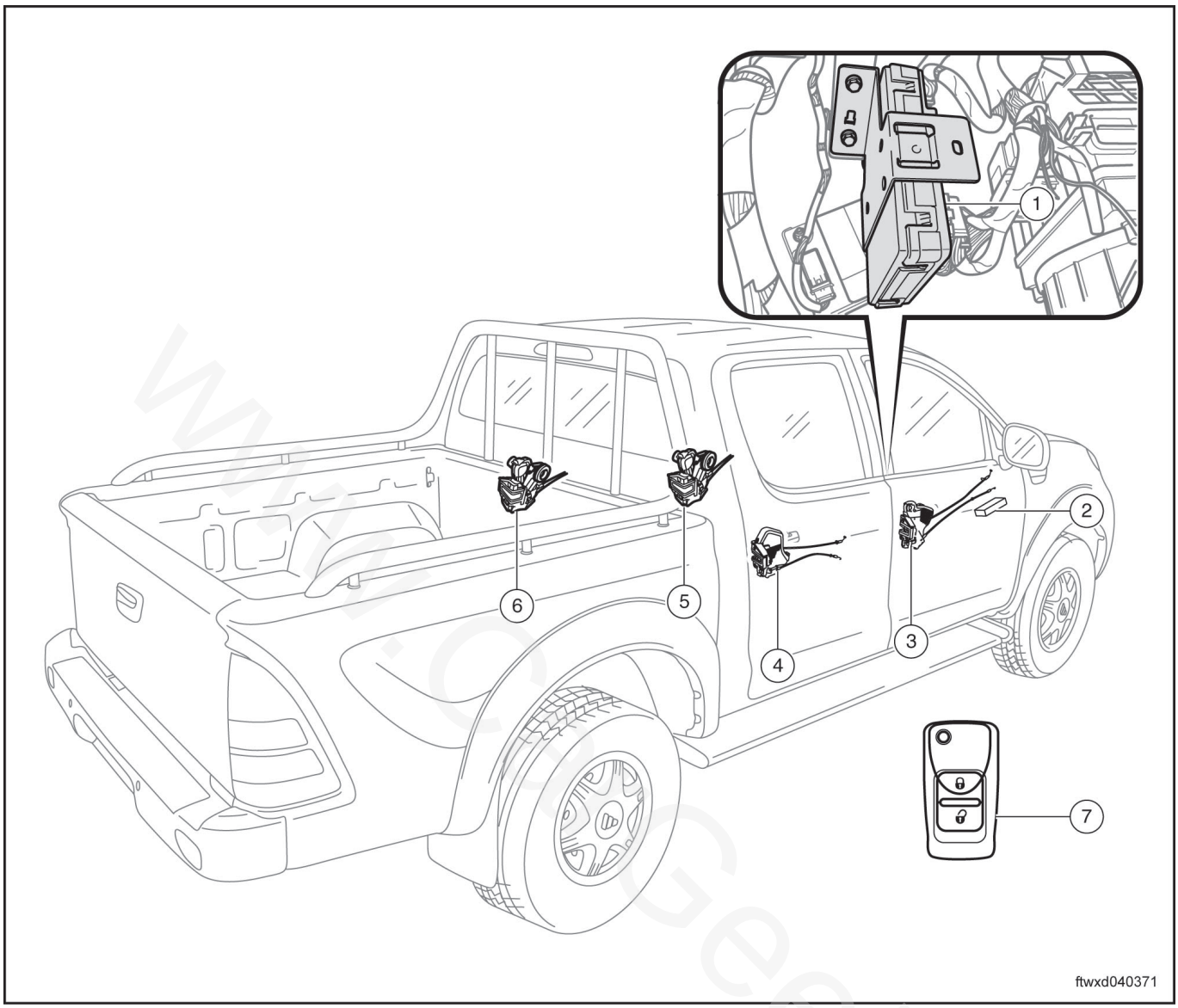
POWER DOOR LOCK CONTROL SYSTEM

PRECAUTION

1 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

COMPONENTS DRAWING



1	Body Controller
2	Control switch assembly, driver’s door
3	Right front lock assy
4	Right rear lock assy

5	Left front lock assy
6	Left rear lock assy
7	Remote control

BASIC INSPECTION

Steps	Inspection contents		Measures
1	**Check Battery voltage** • Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Charge or replace the battery. Refer to “Chapter 20A, start and charge-battery”
2	**Check basic functions** • Use lock master control switch to control the lock and unlock of all doors • Use key to lock the door on the side of the driver, all the doors should be locked. • Use key to lock the door on the side of the driver, all the doors should be locked. **Check whether the result is normal?**	Yes	No> go to step 3
		No?	Go to defect phenomenon form
3	**Check lock-prevention function of the keys** • Insert the key of the door into the ignition switch. • When the driver's door is open, press down driving lever beside the driver to lock the door, and all the doors should be locked and then un-locked. • When the driver's door is open, press down master control switch of the door and all the doors should be locked and then unlocked. **Check whether the result is normal?**	Yes	Go to defect phenomenon form
		No?	Replace body controller

DEFECT PHENOMENON FORM

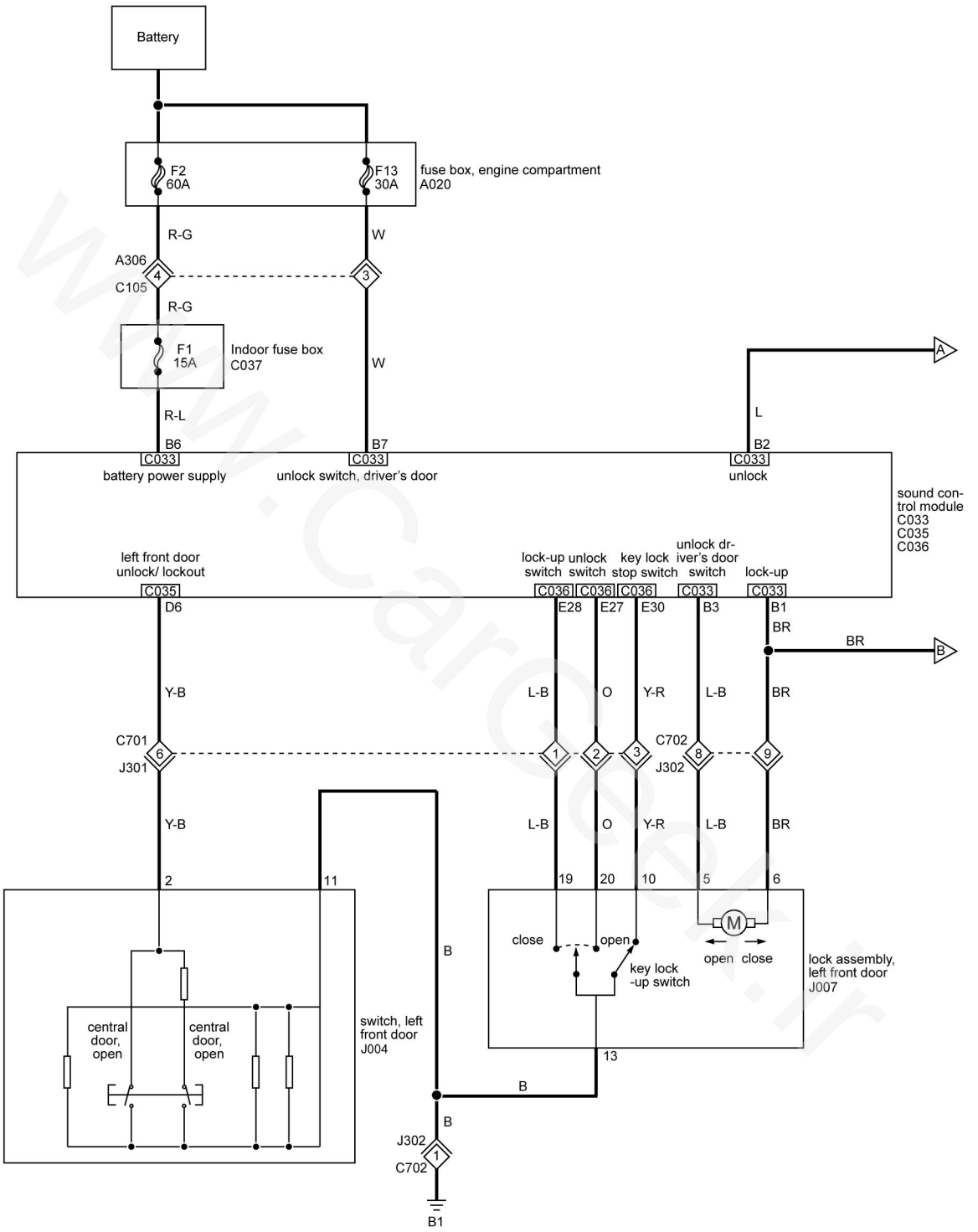
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

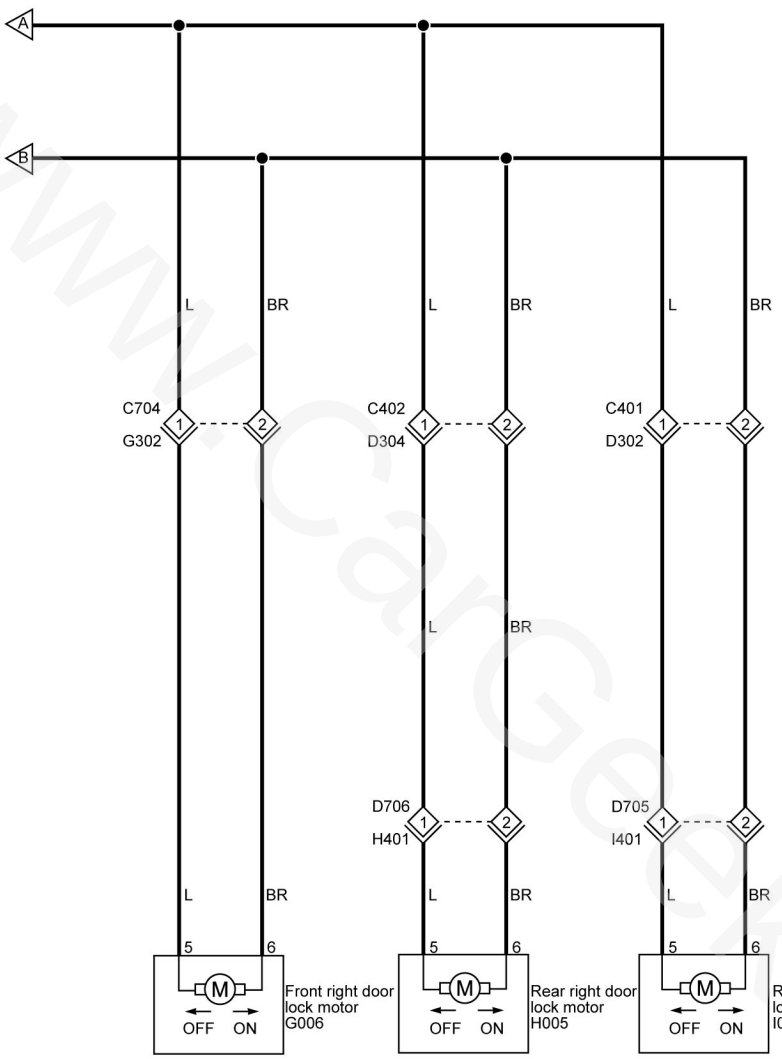
Defect phenomenon	Possible Cause	Reference
Central control lock doesn’t work	1. Power supply, ground circuit	Chapter 4 Diagnosis-power door lock control system, central control lock doesn’t work
	2.Dead lock, Left front door (left front door switch)	Chapter 4 Diagnosis-power door lock control system, central control lock doesn’t work
	3. Body Controller	Chapter 4 Diagnosis-power door lock control system, central control lock doesn’t work
	4. Harness circuit	Chapter 4 Diagnosis-power door lock control system, central control lock doesn’t work
Only the central control lock of one door doesn’t work	1. Central control lock controller	Chapter 4 Diagnosis-power door lock control system, only the central lock of one door doesn’t work
	2. Harness circuit	Chapter 4 Diagnosis-power door lock control system, only the central lock of one door doesn’t work

CENTRAL CONTROL LOCK DOESN’T WORK

Circuit diagram

central control locking system





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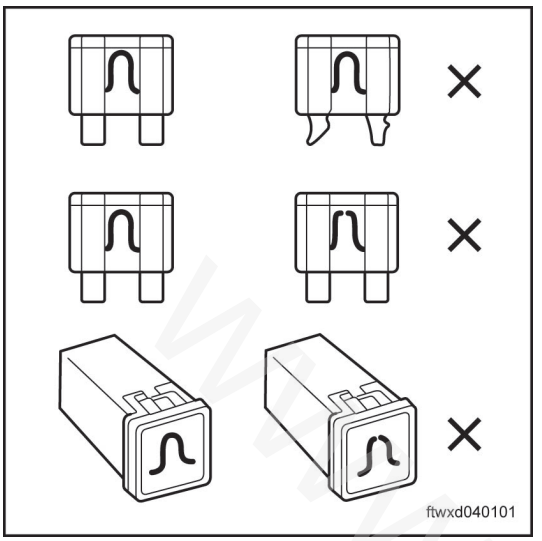
Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check fuse of fuse box, engine compartment: F2 (20A), F13(30A)

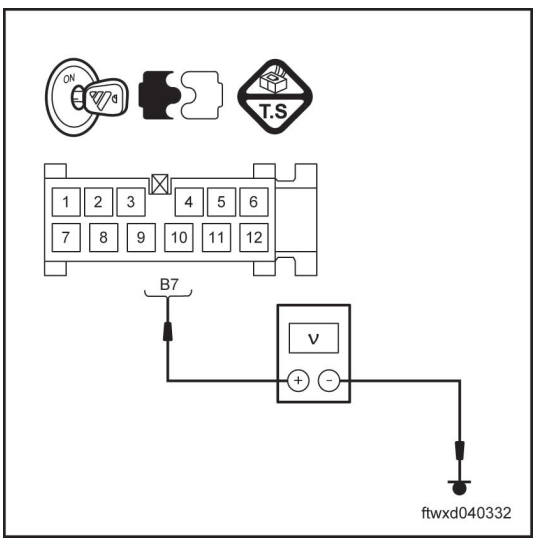
(c) Check fuse of fuse box, engine compartment: F1 (15A)

Check whether the fuse is good or not?

Yes> go to step 2

No> replace fuse

2 . Check fuse: the control circuit from F13 (30 A) to body



(a) Use multimeter to measure the voltage between stich 7 of connector C033 of the body controller and the ground .

Standard voltage

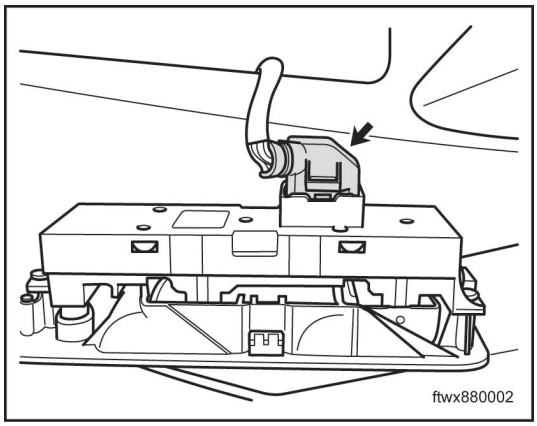
Multimeter connection	Standard value
C033 (B7) ground	Battery voltage

Check whether the result is normal?

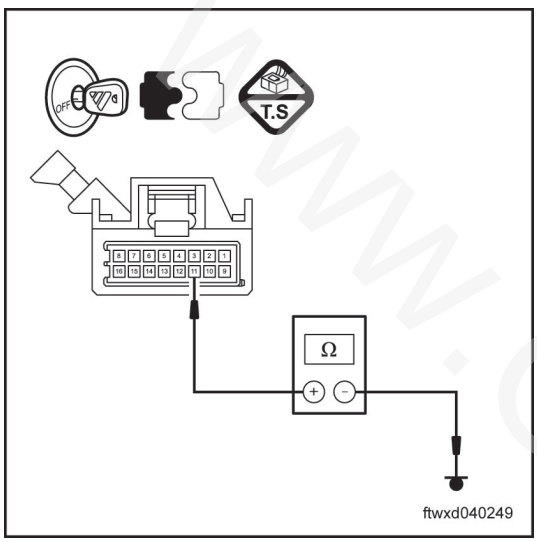
Yes> go to step 3

No > Maintenance or replace harness.

3 . Check harness and connector (power window switch, left front door-ground)



(a) Disconnect connector J004 of power window switch, left front door.



(b) Use multimeter to measure the resistance between stitch 11 of connector J004 of power window switch of left front door and the ground.

Standard electrical resistance (check whether there existent an open circuit)

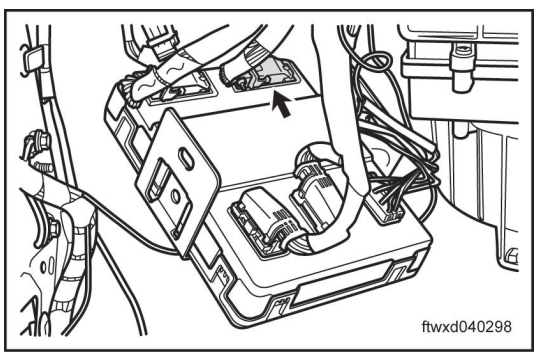
Multimeter connection	Standard value
C040 (11) ground	< 2 Ω

Check whether the result is normal?

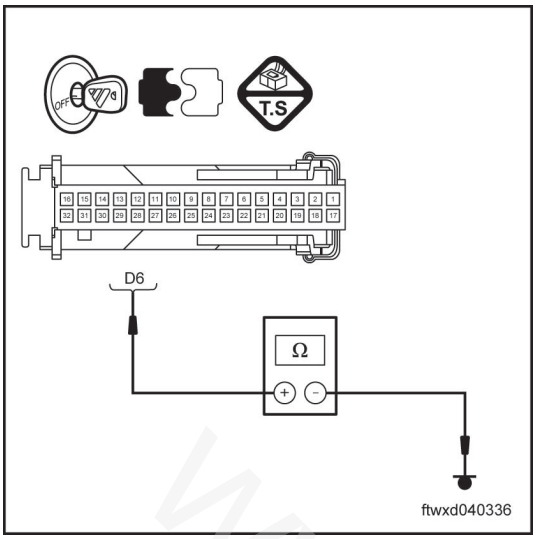
Yes> go to step 4

No > Maintenance or replace harness.

4 . Check circuit of body controller



(a) Disconnect connector C035, body controller.



(b) Use multimeter to measure the resistance between stitch D6 of connector C035 of body controller and the ground.

Standard resistance (check whether there is short circuit)

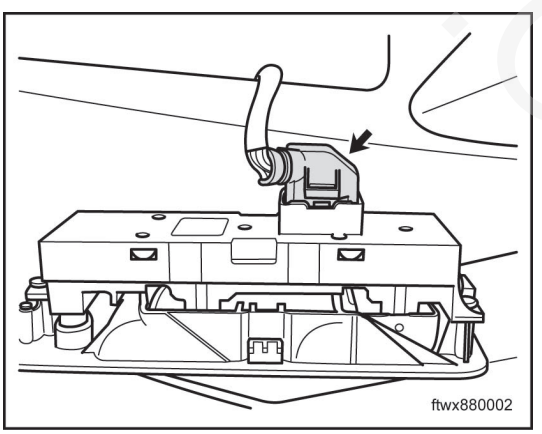
Multimeter connection	Standard value
C035 (D6) ground	⩾ 1 MΩ

Check whether the result is normal?

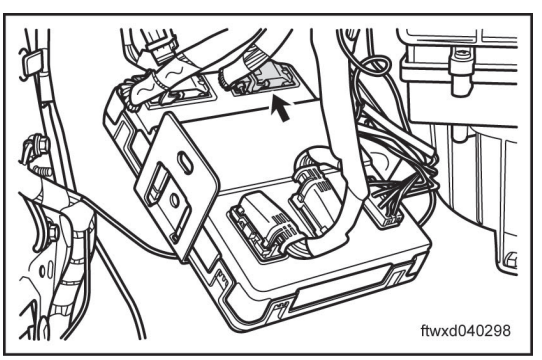
Yes> go to step 5

No> replace body controller

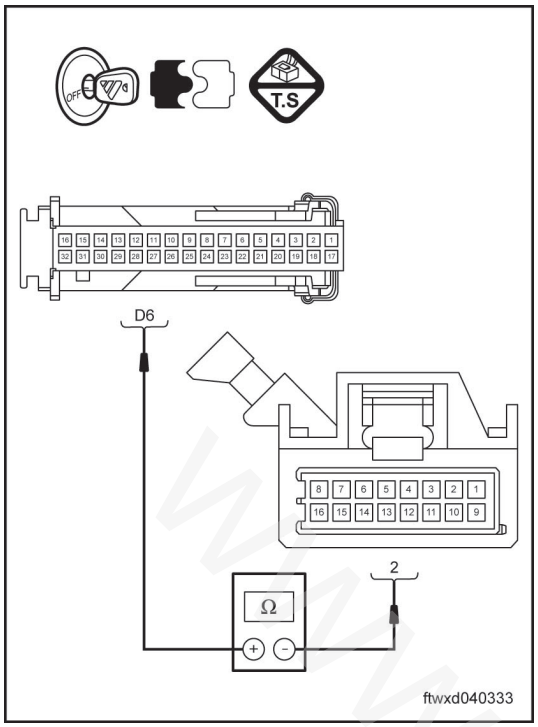
5 . Check harness and connector (body controller-power window switch, left front door)



(a) Disconnect connector J004 of power window switch, left front door.



(b) Disconnect connector C035, body controller.



(c) Use multimeter to measure the resistance between stitch 2 of connector J004 of power window switch of right front door and stitch D6 of connector C035 of body controller.

Standard resistance (check whether there is short circuit)

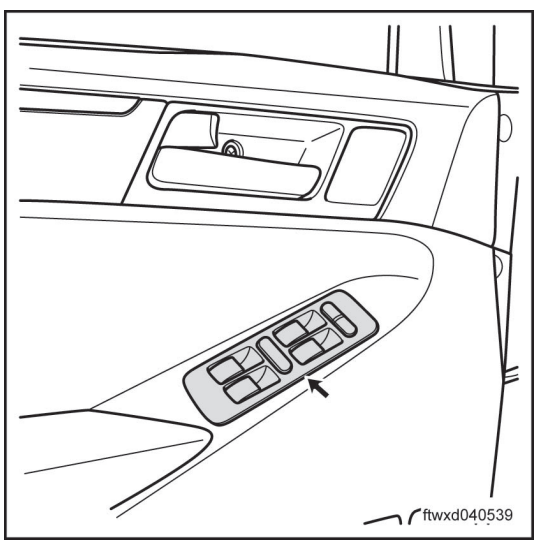
Multimeter connection	Standard value
J004 (2) - C035 (D6)	< 2 Ω

Check whether the result is normal?

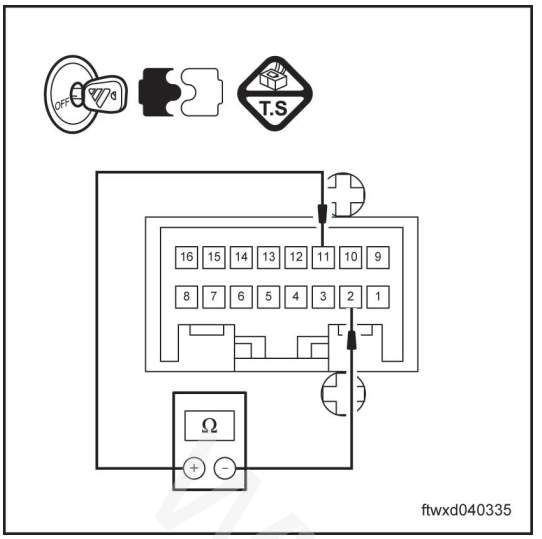
Yes> go to step 6

No > Maintenance or replace harness.

6 . Check power window switch, left front door (central door lock switch)



(a) Dismantle power window switch, left front door.



(b) Use multimeter to measure the resistance between stitch 11of connector J004 of power window switch of left front door and stitch11 .

Standard voltage

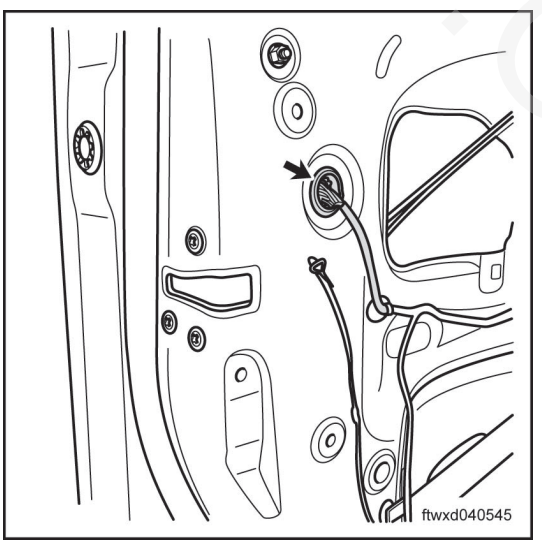
Conditions	Multimeter connection	Standard value
central door lock-closed	J004 (2) - J004 (11)	< 2 Ω
central door - opened	J004 (2) - J004 (11)	

Check whether the result is normal?

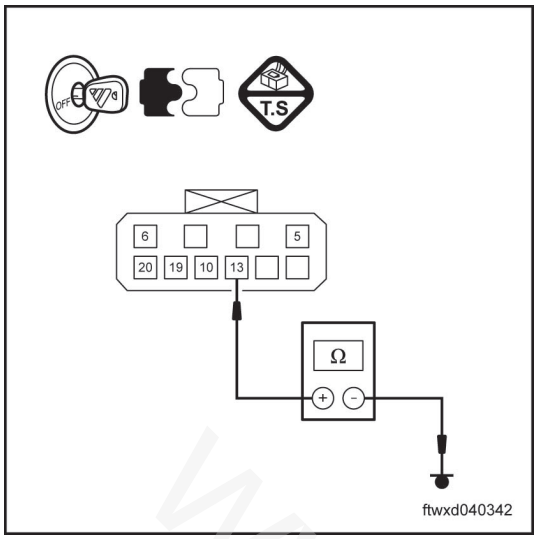
Yes> go to step 7

No> Replace power window switch, left front door.

7 . Check harness and connector (lock assy- left front door-ground)



(a) Disconnect connector J007, lock assy, left front door.



(b) Use multimeter to measure the resistance between stitch 13of connector J007 of lock assy of left front door and the ground.

Standard electrical resistance (check whether there existent an open circuit)

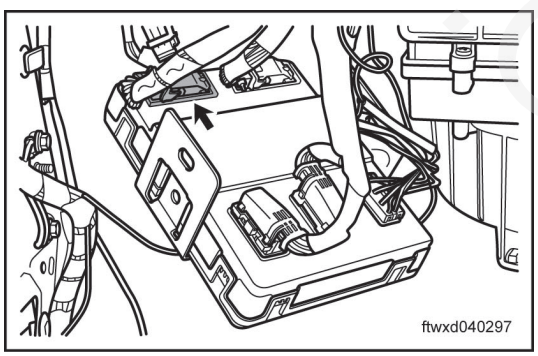
Multimeter connection	Standard value
J007(13) ground	< 2 Ω

Check whether the result is normal?

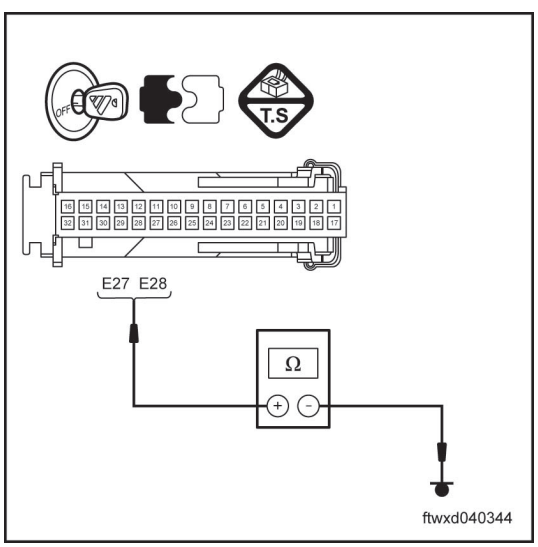
Yes> go to step 8

No > Maintenance or replace harness.

8 . Check circuit of body controller



(a) Disconnect body controller C036 connector.



(b) Use multimeter to measure the resistance between. stitches E27, E28of connector C036 of the body controller and the ground.

Standard resistance (check whether there is short circuit)

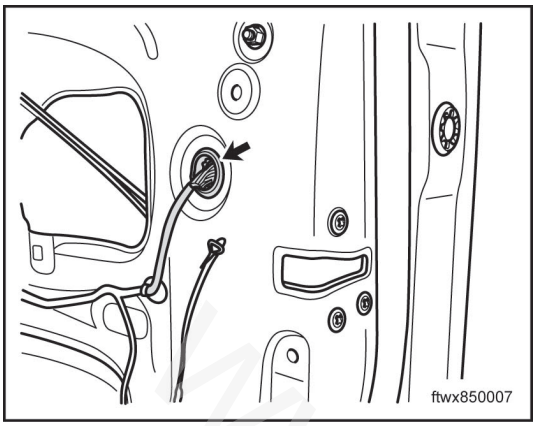
Multimeter connection	Standard value
C036 (E27) ground	⩾ 1 MΩ
C036 (E28) ground	

Check whether the result is normal?

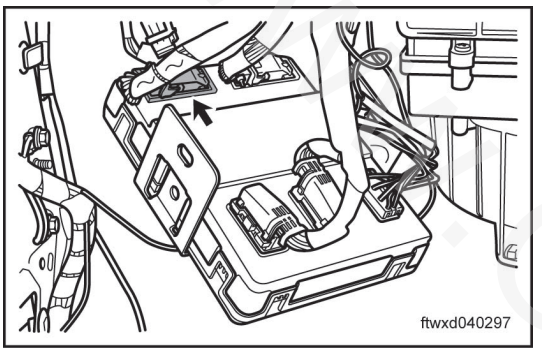
Yes> go to step 9

No> replace body controller

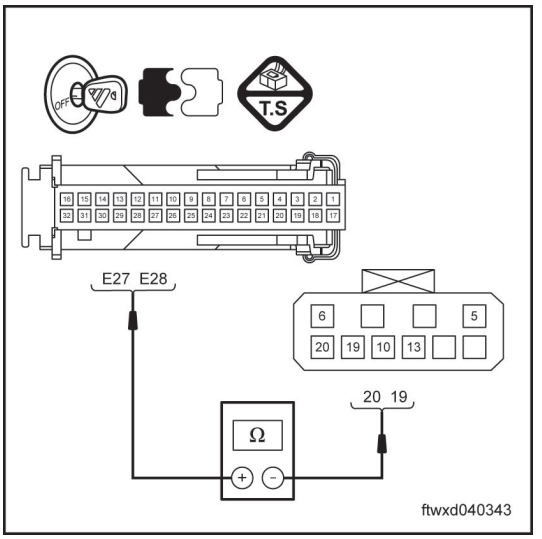
9 . Check harness and connector (body controller-power window switch, left front door)



(a) Disconnect connector J007, lock assy, left front door.



(b) Disconnect body controller C036 connector.



(c) Use multimeter to measure the resistance between stitches 19 and 20 of connector J007of lock assy for the left front door and stitchesE27,28 of connector C036 of body controller.

Standard resistance (check whether there is short circuit)

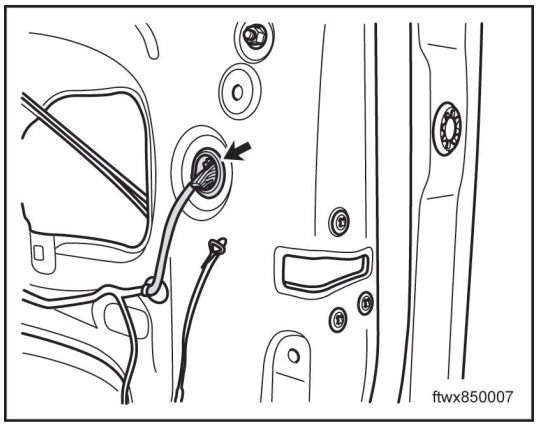
Multimeter connection	Standard value
J007 (19) - C036 (E28)	< 2 Ω
J007 (20) - C036 (E27)	

Check whether the result is normal?

Yes> go to step 10

No > Maintenance or replace harness.

10 . Check lock assy, left front door



(a) Disconnect connector J007, lock assy, left front door.

(b) Use multimeter to measure the resistance between stitches19 and 20 of connector J007 of lock assy for the left front door and stitch13.

Standard voltage

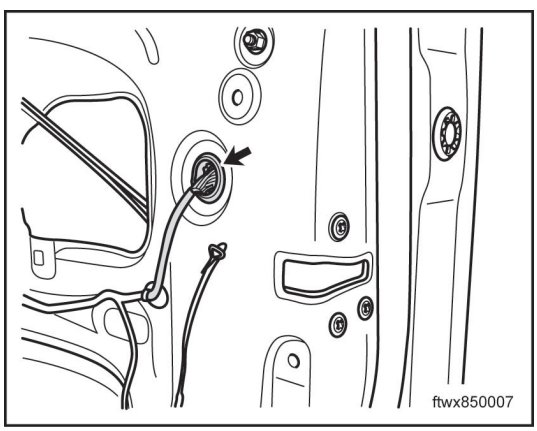
Conditions	Multimeter connection	Standard value
The switch of lock-up clutch, closed	J007 (19) - J007 (13)	< 2 Ω
The switch of lock-up clutch, opened	J007 (20) - J007 (13)	

Check whether the result is normal?

Yes> go to step 11

No> Replace lock assy, left front door.

11 . Check signal output circuit, body controller

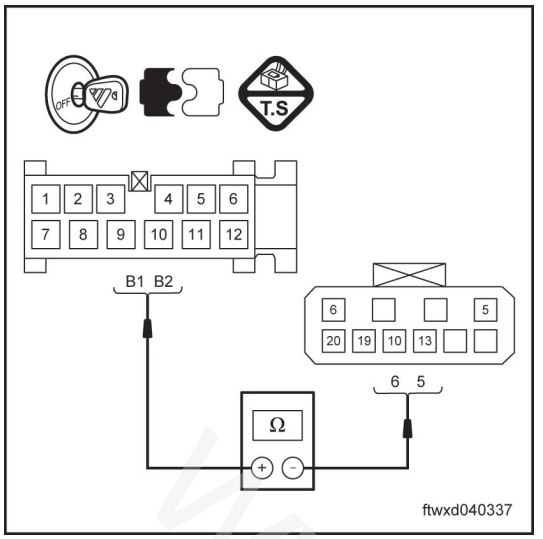


(a) Disconnect connector G006 of door lock motor of right front door. (Left driving type)

(b) Disconnect connector G006 of door lock motor of left front door. (Right driving type)

(c) Disconnect connector I005of door lock motor of left rear door.

(d) Disconnect connector H005 of door lock motor of right rear door.



(e) Use multimeter to measure the resistance between stitches B1, B2 of connector C033 of body controller and stitches 6 and 5.

Standard resistance (check whether there is short circuit)

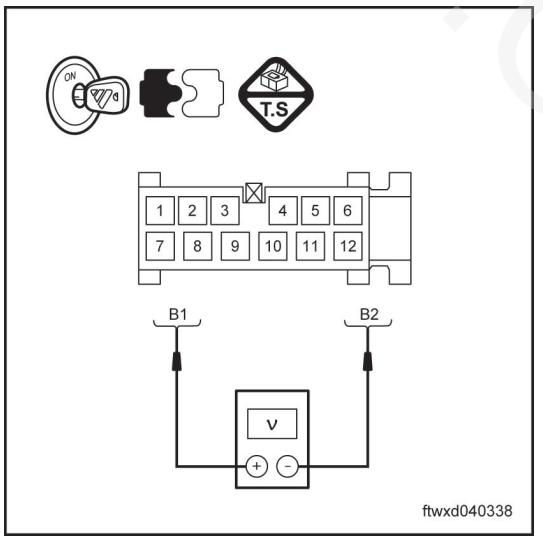
Multimeter connection	Standard value
C033(B1)-G006(6)or H005(6)or I005(6)	⩽ 2 Ω
C033(B2)-G006(5)or H005(5)or I005(5)	

Check whether the result is normal?

Yes> go to step 12

No > Maintenance or replace harness.

12 . Check signal output circuit, body controller



(a) Close all the doors of the vehicle.

(b) Use power switch of left front door to lock and unlock repsectively, meanwhile use multimeter to measure the voltage between stitchB1 of connector C033 of body controller and stitch 2 The voltage should appear twice.

Standard voltage

Multimeter connection	Standard value
C033 (B1) - C033 (B2)	Battery voltage（**Lasts about 0.3 ～ 1.1 s**）

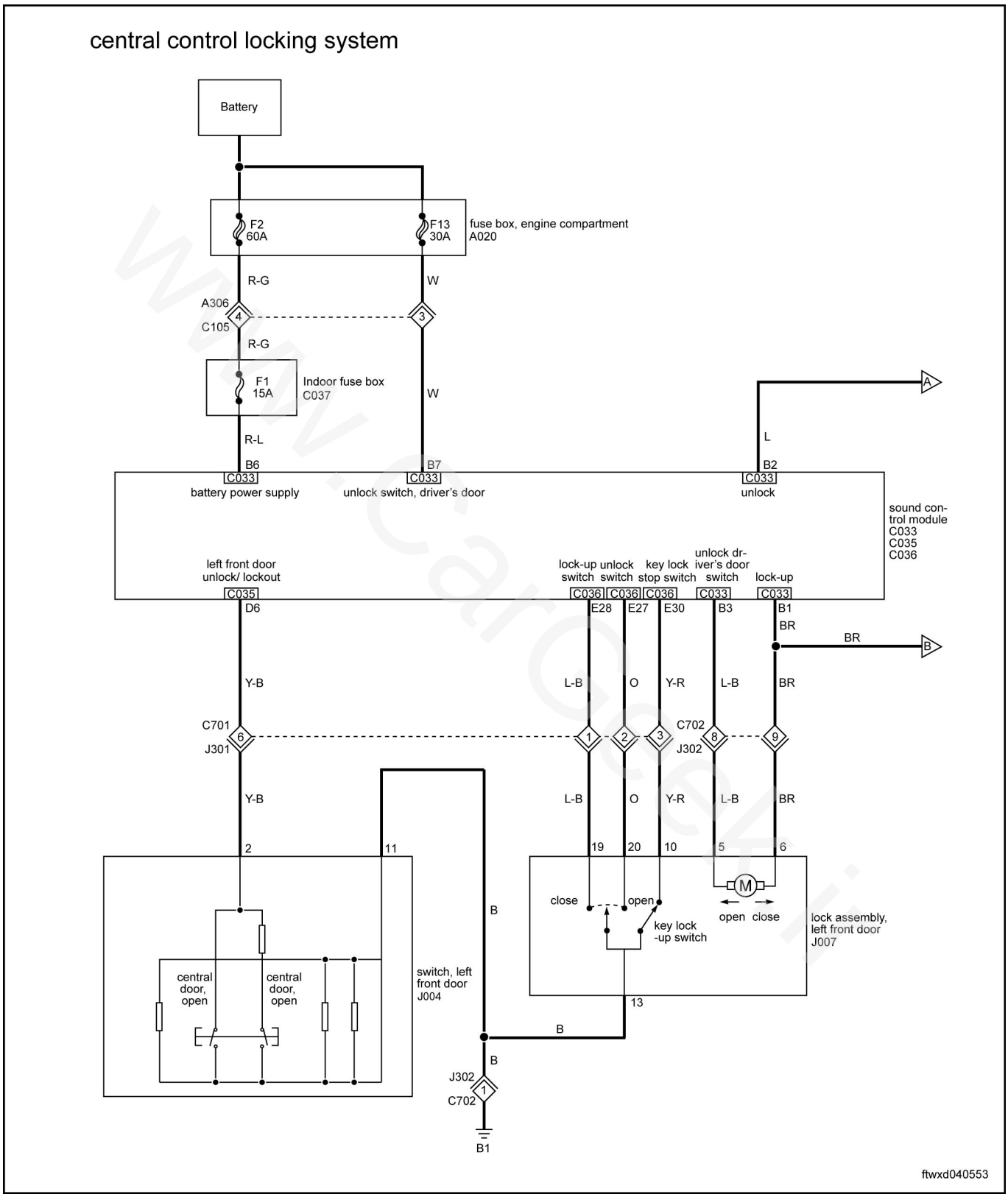
Check whether the result is normal?

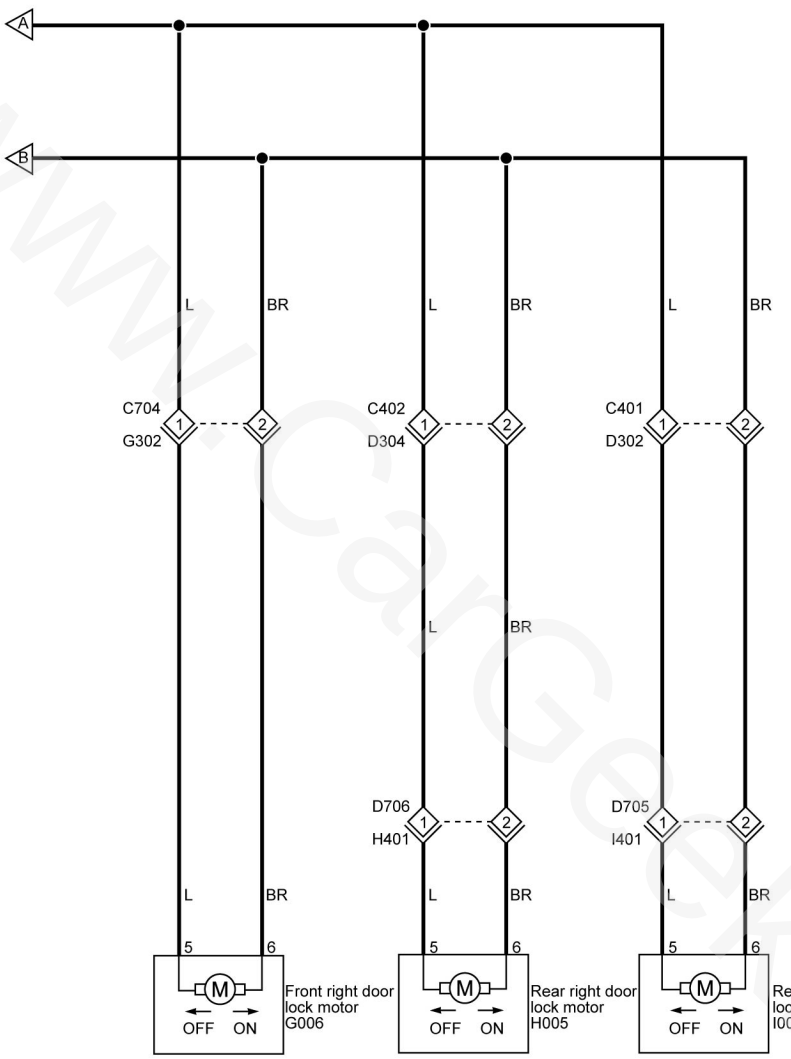
Yes> Maintain or replace harness.

No> replace body controller

ONLY THE CENTRAL CONTROL LOCK OF ONE DOOR DOESN’T WORK

Circuit diagram





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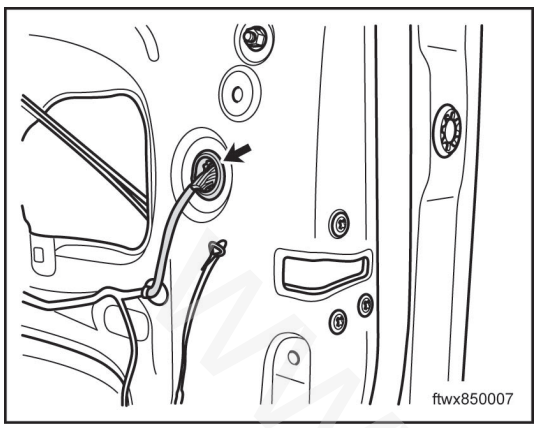
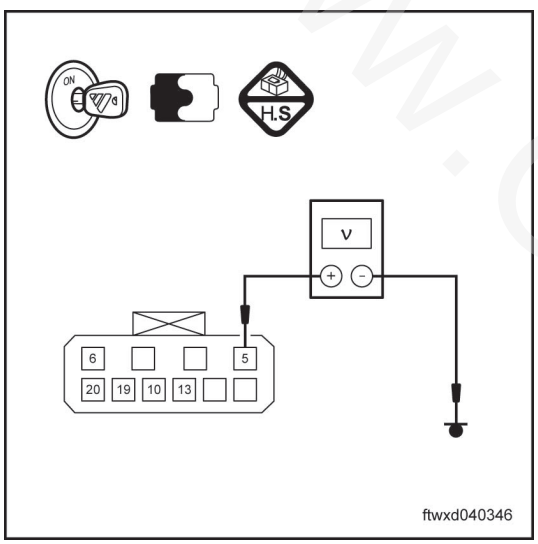
Diagnostic steps

- **This diagnostic step follows right front door, and the diagnosis of other door is the same as the right front door.**

1 . Check motor control circuit, right front door lock



(a) Disconnect connector G006 of door lock motor of right front door.



(b) Use master control switch to lock the door, meanwhile use multimeter to measure the voltage between stitch5 of connector G006 of right front lock motor and the ground.

Standard voltage

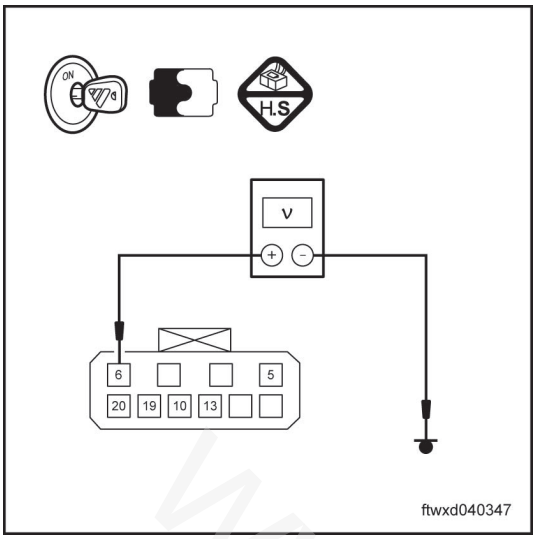
Multimeter connection	Standard value
G006 (5) ground	Battery voltage (Lasts about 0.3 ～ 1.1 s)

Check whether the result is normal?

Yes> go to step 3

No> Repair the open circuit between stitch 5 of connector G006 of the lock motor, right front door and stitch B2 of connector C033 of the body controller.

2 . Check motor control circuit, right front door lock



(a) Use master control switch to unlock the door, meanwhile use multimeter to measure the voltage between Stitch 6 of connector G006 of the right front lock motor and the ground

Standard voltage

Multimeter connection	Standard value
G006 (6) ground	Battery voltage (Lasts about 0.3 ~ 1.1 s)

Check whether the result is normal?

Yes> replace lock motor, right front door

No> Repair the open circuit between stitch 6 of connector G006 of the lock motor, right front door and stitch B3 of connector C033 of the body controller.

WIPER & WASHER

PRECAUTION

1 . Ignition switch representation

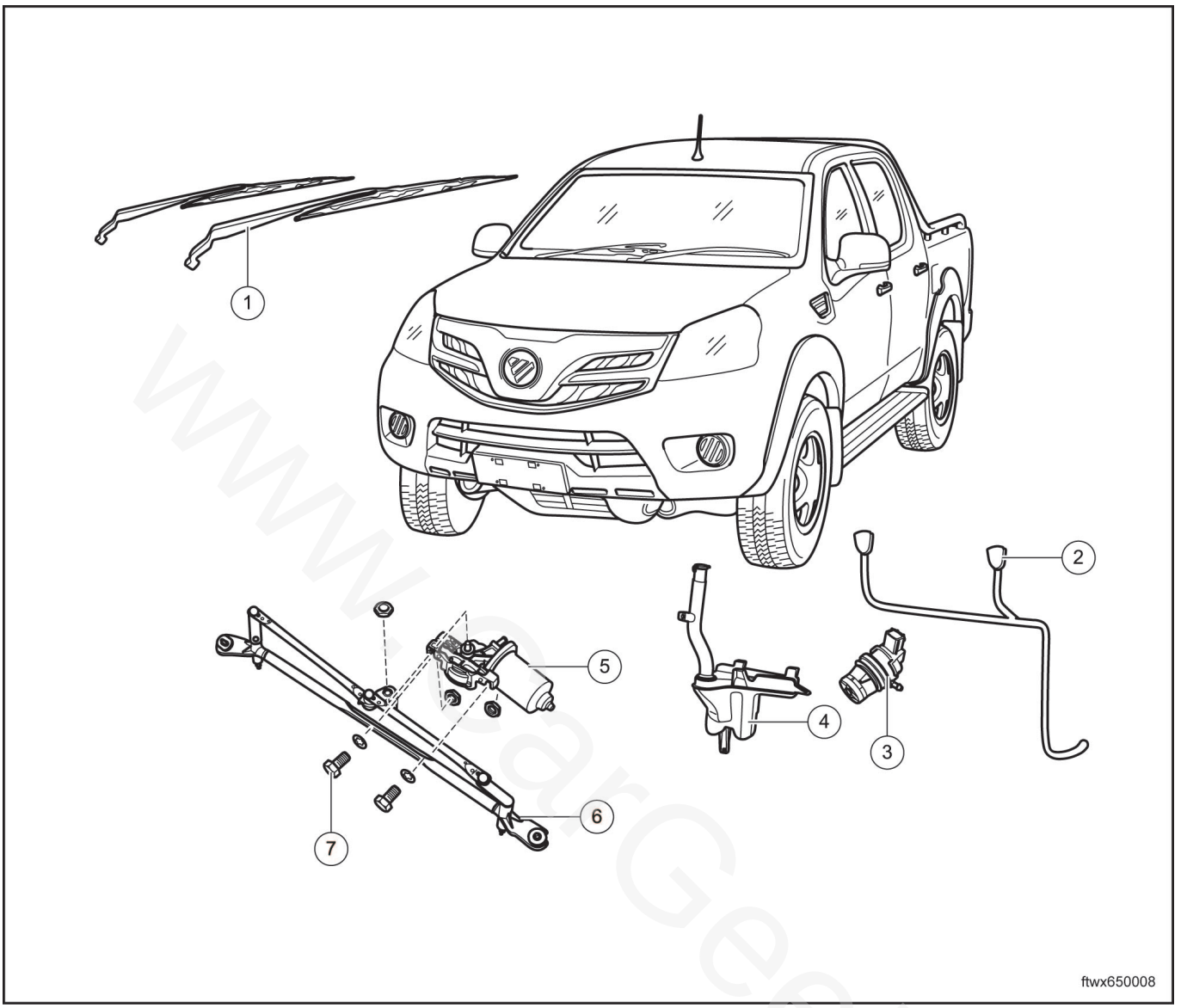
Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

2 . Switch off the power.

(a) Before dismounting or installing any electric apparatus, or when tool or equipment is susceptible to touch exposed electric pins, be sure to disconnect the negative-pole cable of battery firstly to prevent persons or vehicle from being damaged.

(b) If there is special illustration, ignition switch must be closed.

COMPONENTS DRAWING



1	Wiper assembly
2	Nozzle (with wash tube)
3	Motor, washer
4	Reservoir, wiper

5	Motor assembly, wiper
6	Connecting rod assembly, wiper
7	Bolt

BASIC INSPECTION

Steps	Inspection contents		Measures
1	**Check Battery voltage** • Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Charge or replace the battery. see "Chapter 20 Startup and charging – battery, replacement"
2	**check the high-speed gear of wiper.** • Use combination switch to turn on the high-speed gear of wiper. **Check whether the result is normal?**	Yes	No> go to step 3
		No?	to Defect Phenomenon Form
3	**check the low-speed gear of wiper.** • Ignition Switch: ON. • Use combination switch to turn on the low-speed gear of wiper. **Check whether the result is normal?**	Yes	No> go to step 4
		No?	to Defect Phenomenon Form
4	**check the intermittence gear of wiper.** • Use combination switch to turn on the intermittence gear of wiper. **Check whether the result is normal?**	Yes	Check the wiper motor.
		No?	to Defect Phenomenon Form

DEFECT PHENOMENON FORM

Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

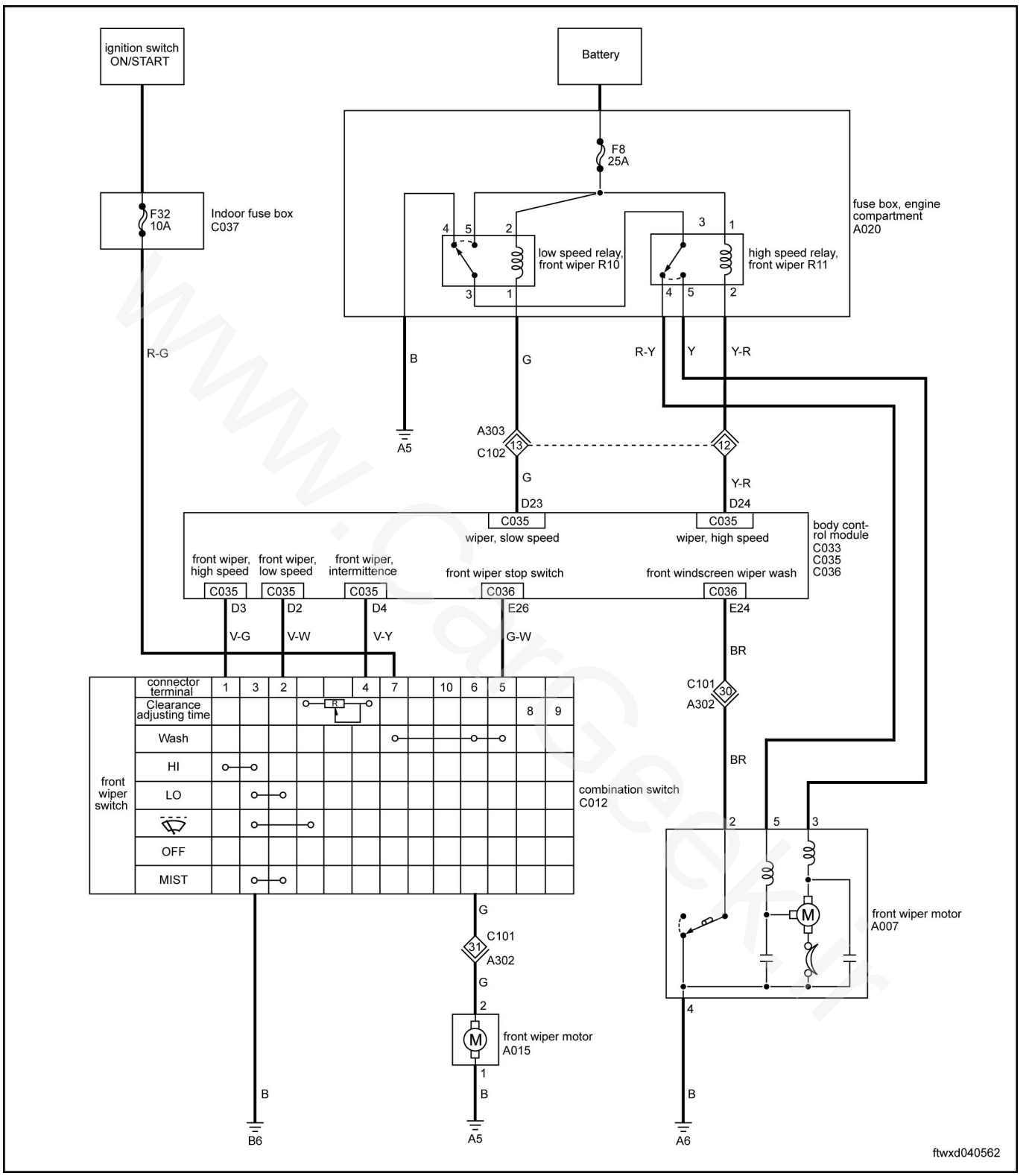
Defect phenomenon	Suspect Area	Reference
Front wiper does not work	1. Fuse (damaged)	-
	2. Wiper switch (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	3. Wiper motor (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	4. Harness (broken circuit or short circuit)	-
High-speed control circuit of front wiper is open-circuited\ High-speed control circuit of front wiper is subjected to high current	1. Wiper switch (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	2. Wiper motor (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	3. Harness (broken circuit or short circuit)	-
Low-speed control circuit of front wiper is open-circuited\ Low-speed control circuit of front wiper is subjected to high current	1. Wiper switch (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	2. Wiper motor (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	3. Harness (broken circuit or short circuit)	-
Wiper does not work	1. Wiper switch (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	2. Intermittent activator of wiper (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	3. Wiper motor (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	4. Harness (broken circuit or short circuit)	-
Wiper arm cannot return or is positioned incorrectly (wiper switch is turned off)	1. Wiper arm (installed incorrectly)	Chapter 65 Wiper and washer – replacement of wiper assembly
	2. Wiper motor (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	3. Harness (broken circuit or short circuit)	-
abnormal sound given by wiper	1. Worm (getting rusty or lack of lubrication)	Chapter 65 Wiper and washer – replacement of connecting rod assembly of wiper
	2. Connecting rod (wear or deformed)	Chapter 65 Wiper and washer – replacement of connecting rod assembly of wiper
	3. Wiper blade (rubber aging or chapping)	Chapter 65 Wiper and washer – replacement of wiper blade assembly

Defect phenomenon	Suspect Area	Reference
Wiping effect is poor	1. Windshield glass (oily stain or car wax)	-
	2. Washing liquid (poor quality)	-
	3. Wiper blade (incorrect type)	-
	4. Wiper blade (rubber aging or chapping)	Chapter 65 Wiper and washer – replacement of wiper blade assembly
	5. Wiper arms (deformed or damaged)	Chapter 65 Wiper and washer – replacement of wiper assembly
	6. Wiper arms (deteriorated spring)	Chapter 65 Wiper and washer – replacement of wiper assembly
Washer doesn't work	1. Washer switch (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	2. Washer pump assembly (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
	3. Harness (broken circuit or short circuit)	-
No washer fluid injection or weak injection	1. Washer fluid (inadequate)	-
	2. Washer fluid (frozen)	-
	3. Washer fluid hose (damaged or blocked)	-
	4. Nozzle (blocked)	Chapter 65. Wiper & washer - nozzle, check")
	5. Washer pump assembly (damaged)	Chapter 65 Wiper and washer - inspection of wiper and washer
Incorrect nozzle coverage	1. Nozzle (adjustment required)	Chapter 65 Wiper and washer - inspection of wiper and washer

04

FRONT WIPER DOESN'T WORK

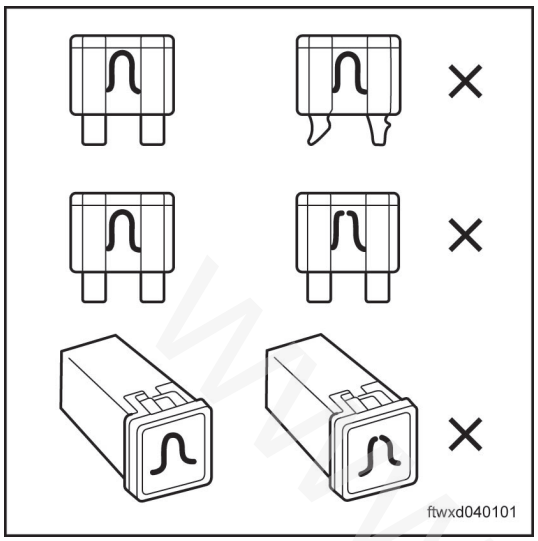
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse inside engine compartment: F8 (25A)

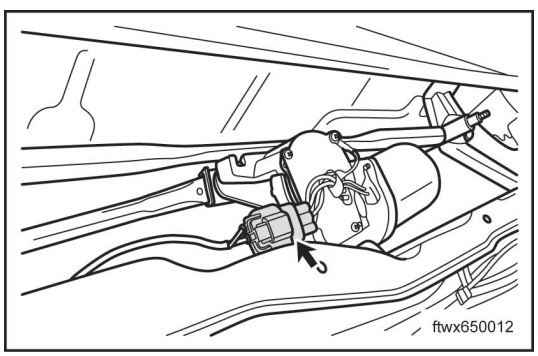
Check whether the result is normal?

Yes> go to step 3

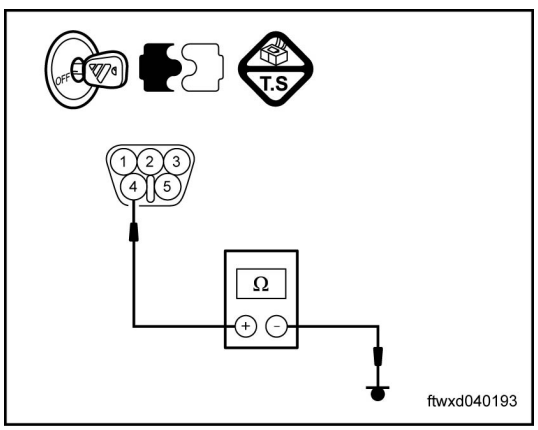
No> replace fuse

2 . Check the harness and connectors (front wiper assembly - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector A007 of front wiper assembly.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A 007 (4) - ground	< 2 Ω

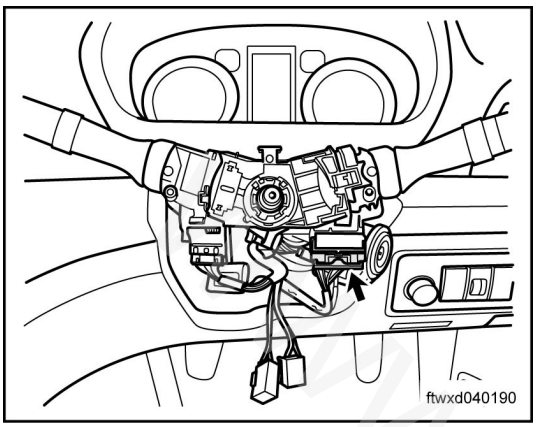
Check whether the result is normal?

Yes> go to next step.

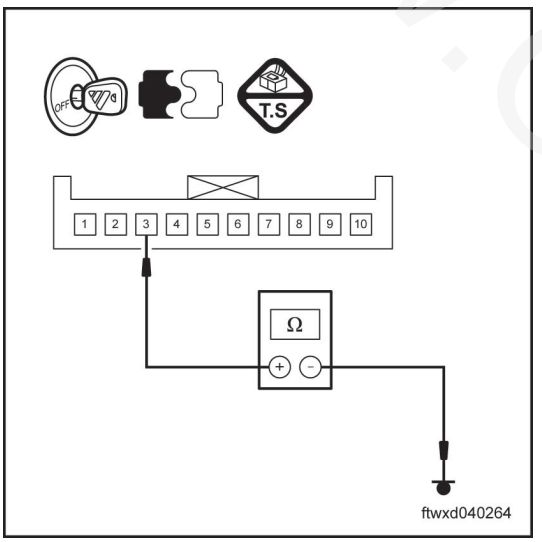
No > Maintain or replace the harness

3 . Check the harness and connectors (wiper and washer switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C012 (3) - ground	< 2 Ω

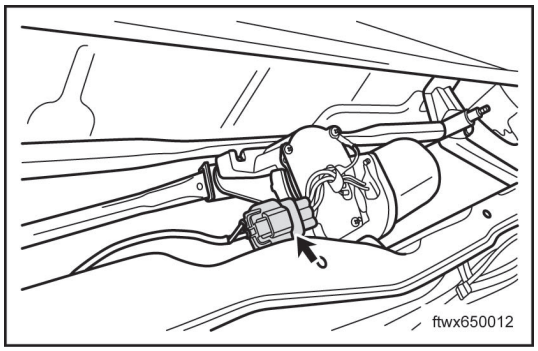
Check whether the result is normal?

Yes> go to next step.

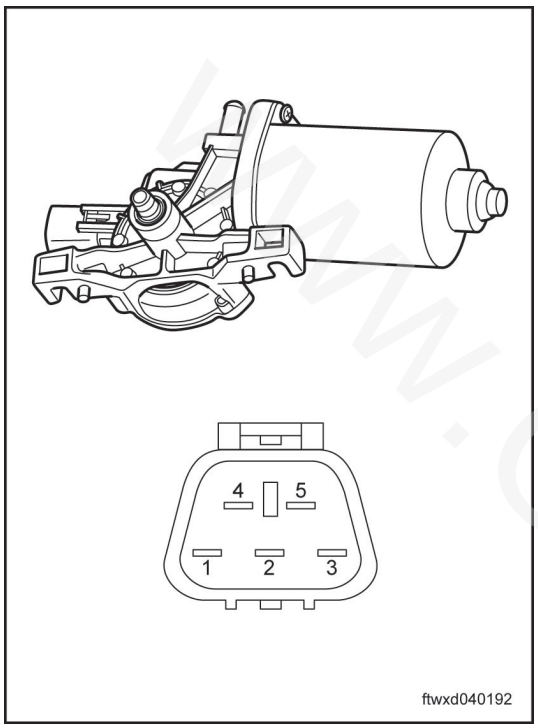
No > Maintenance or replace harness.

4 . Check the front washer motor.

(a) Ignition Switch: OFF.



(b) Disconnect the connector A007 of front wiper assembly.



(c) Check the low gear function of front washer motor.

Conditions	Connecting pin	Specified value
Apply a battery voltage to between the pins 1 and 5	Battery (+)- 5	Low-speed running of front wiper motor
	Battery (-)- 4	

(d) Check the high gear function of front wiper motor.

Conditions	Connecting pin	Specified value
Apply a battery voltage to between the pins 3 and 4	Battery (+)- 3	High-speed running of front wiper motor
	Battery (-)- 4	

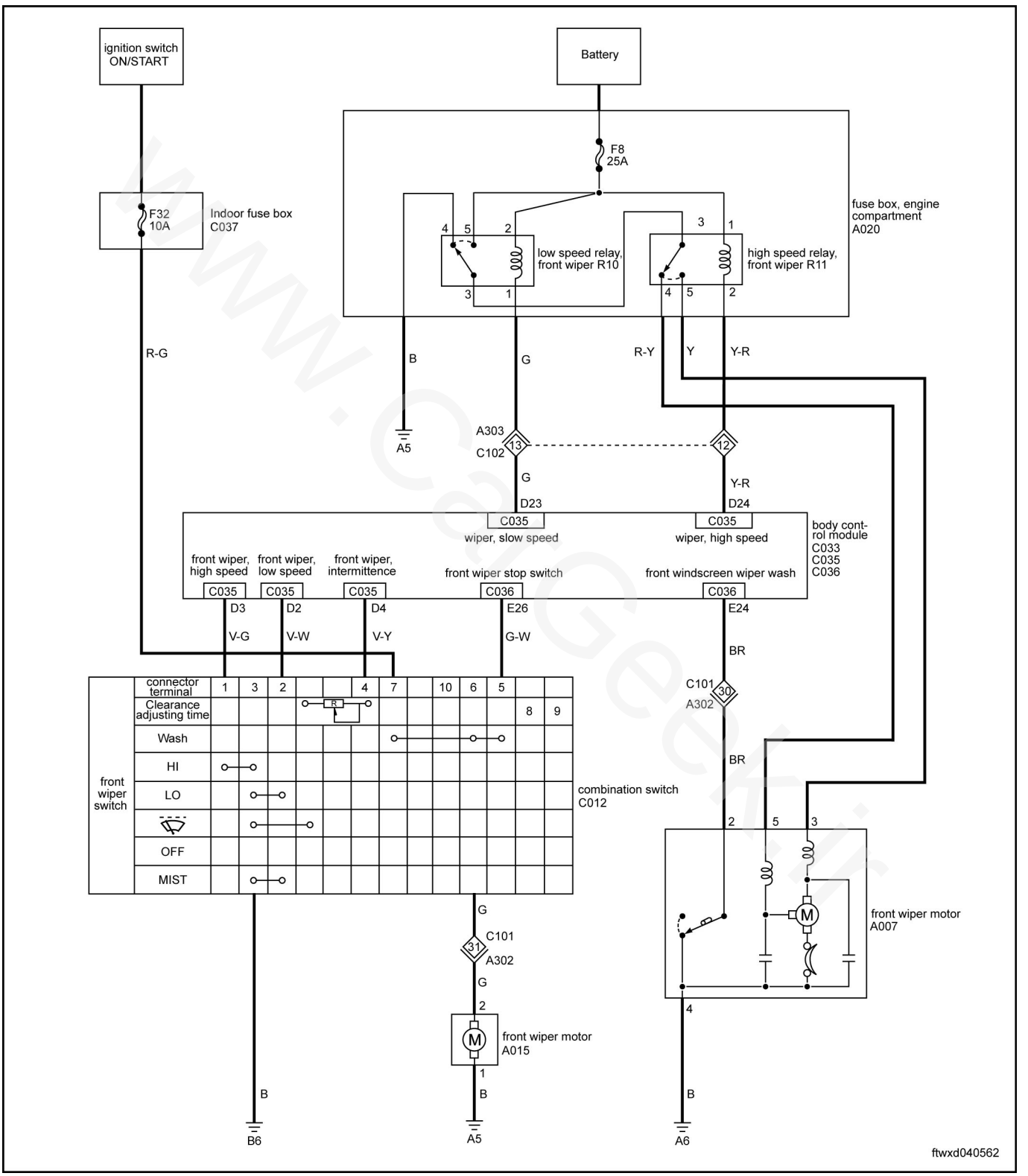
Check whether the result is normal?

Yes> go to next step.

No > Replace the motor assembly of front wiper.

B1376 HIGH-SPEED CONTROL CIRCUIT OF FRONT WIPER IS OPEN-CIRCUITED
B1377 HIGH-SPEED CONTROL CIRCUIT OF FRONT WIPER IS SUBJECTED TO HIGH CURRENT

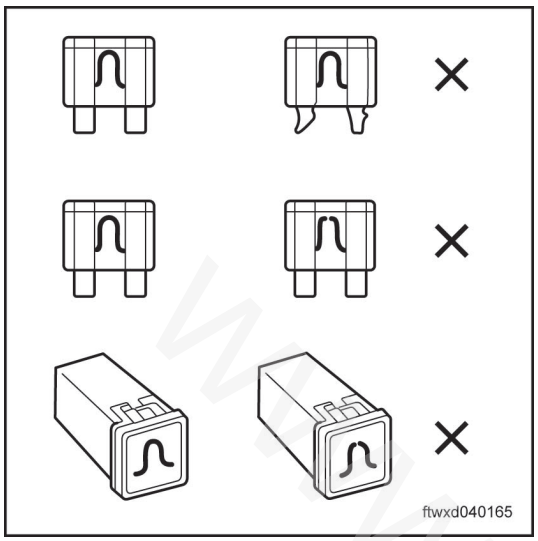
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check fuse: F8 (25A) inside interior fuse box fuse.

Check whether the result is normal?

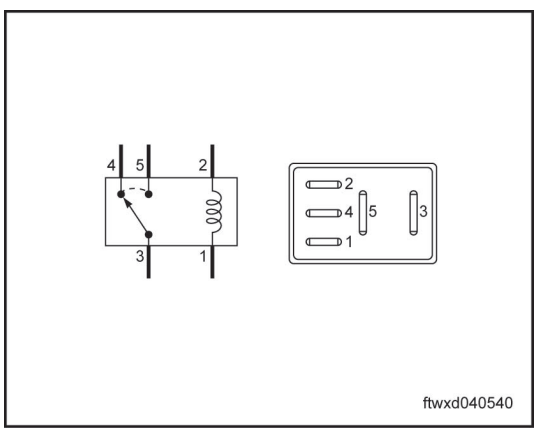
Yes> go to step 2

No> replace fuse

2 . check the high speed relay of front wiper.

(a) Ignition Switch: OFF.

(b) Pull out the high speed relay R11 of front wiper.



(c) Measure the electrical resistance based on the value in the following form.

Standard voltage

Conditions	Multimeter connection	Standard value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitch 1 and 2,	3 - 5	< 2 Ω

Check whether the result is normal?

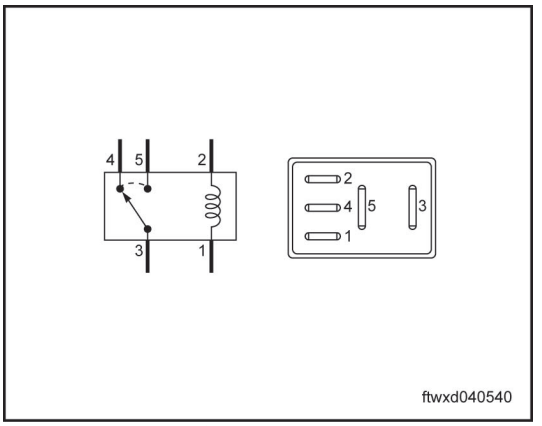
Yes> go to step 3

No > Replace the high speed relay of front wiper.

3 . check the low speed relay of front wiper.

(a) Ignition Switch: OFF.

(b) Pull out the low speed relay R10 of front wiper.



(c) Measure the electrical resistance based on the value in the following form.

Standard voltage

Conditions	Multimeter connection	Standard value
Normal situation	1 - 2	Breakover
Normal situation	3 - 4	< 2 Ω
Apply power supply voltage to position between stitch 1 and 2,	3 - 5	< 2 Ω

Check whether the result is normal?

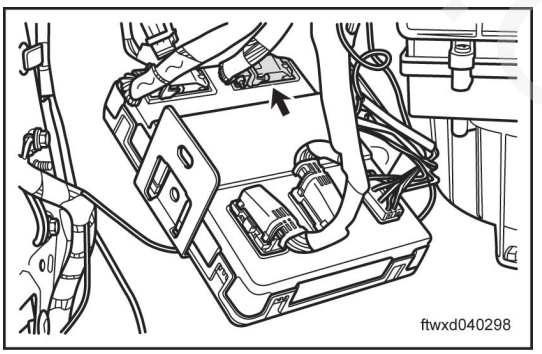
Yes> go to step 4

No > Replace the low speed relay of front wiper.

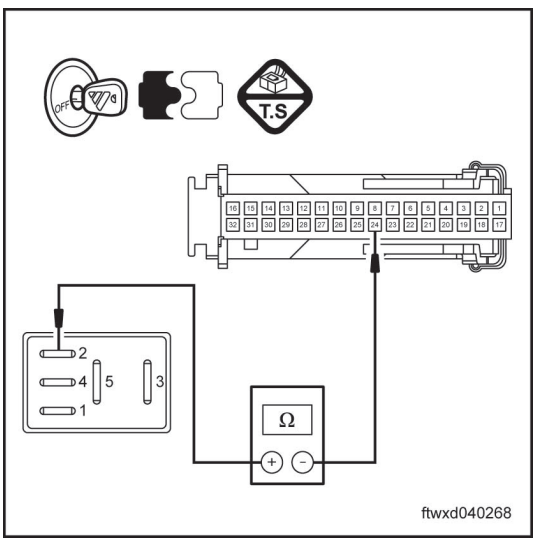
4 . Check the harness and connectors (high speed relay of front wiper - BCM control unit)

(a) Ignition Switch: OFF.

(b) Pull out the high speed relay R11 of front wiper.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
R11（2）-C035（D24）	< 2 Ω

Check whether the result is normal?

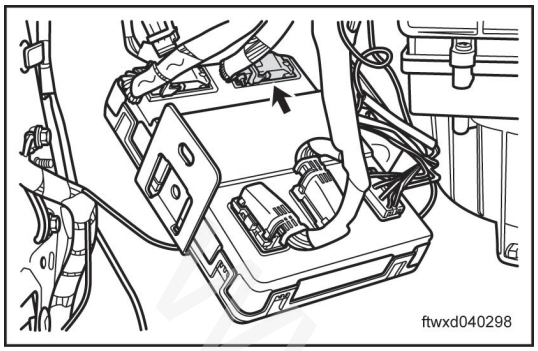
Yes> go to step 5

No > Maintenance or replace harness.

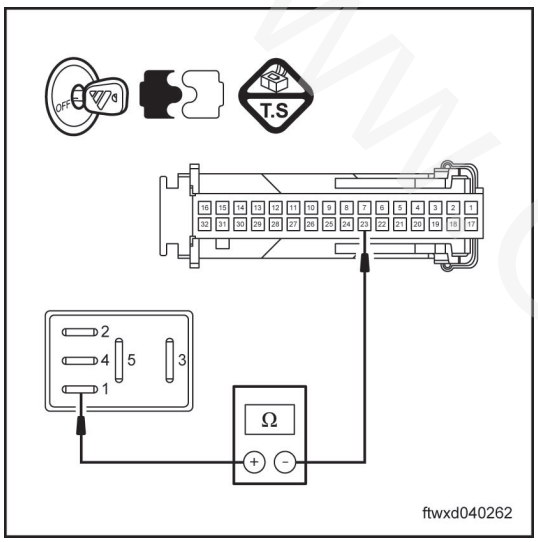
5 . Check the harness and connectors (low speed relay of front wiper - BCM control unit)

(a) Ignition Switch: OFF.

(b) Pull out the low speed relay R10 of front wiper.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
R10（1）-C035 （D23）	＜ 2 Ω

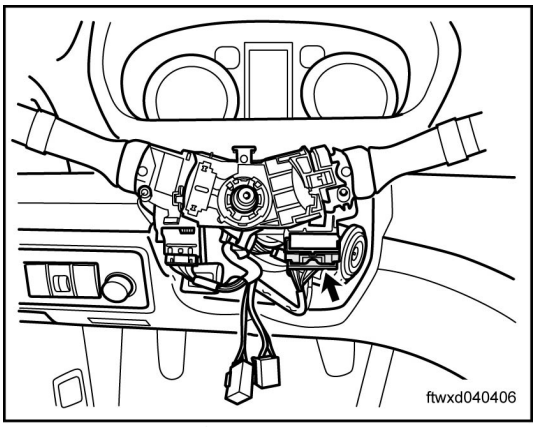
Check whether the result is normal?

Yes> go to step 6

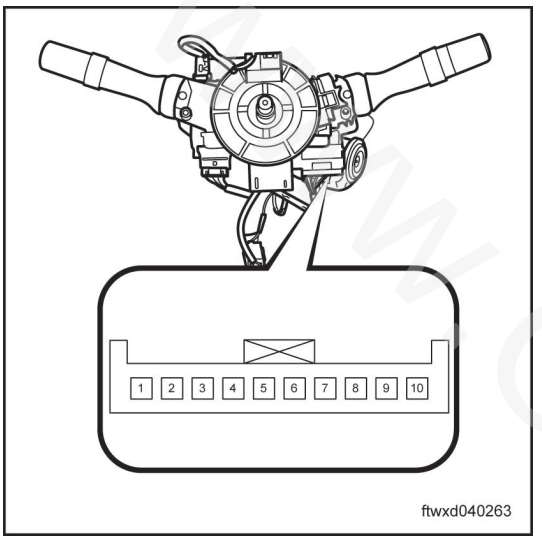
No > Maintenance or replace harness.

6 . Check the combination switch (wiper).

(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Check the combination switch (wiper).

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Switch off the wiper switch	1-3	⩾ 1 MΩ
Turn on the low-speed gear of wiper switch	1-3	< 2 Ω

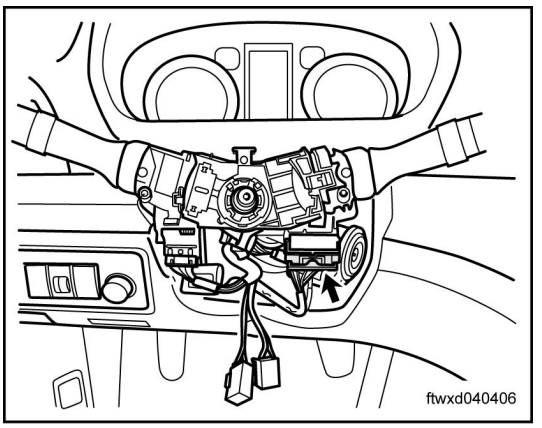
Check whether the result is normal?

Yes> go to step 7

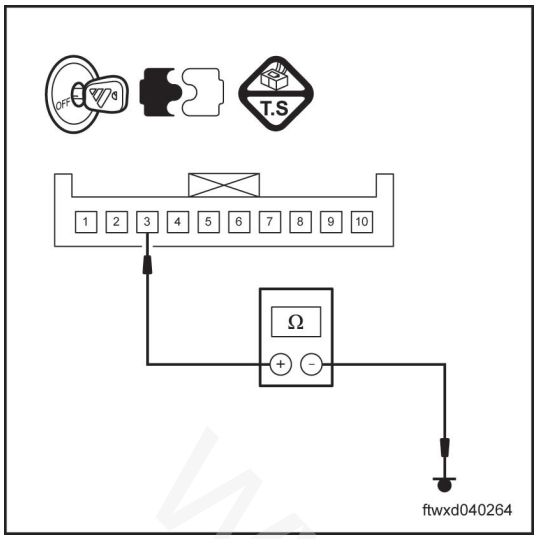
No > Replace the combination switch.

7 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
C012 (3) - ground	< 2 Ω

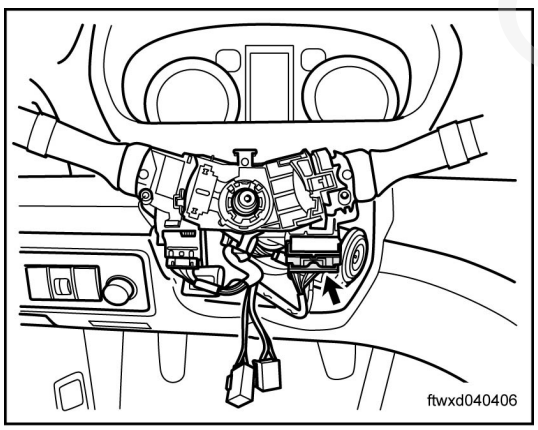
Check whether the result is normal?

Yes> go to step 8

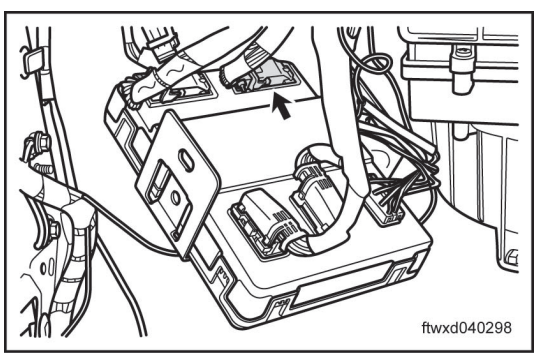
No > Maintenance or replace harness.

8 . Check the harness and connectors (combination switch - BCM control unit)

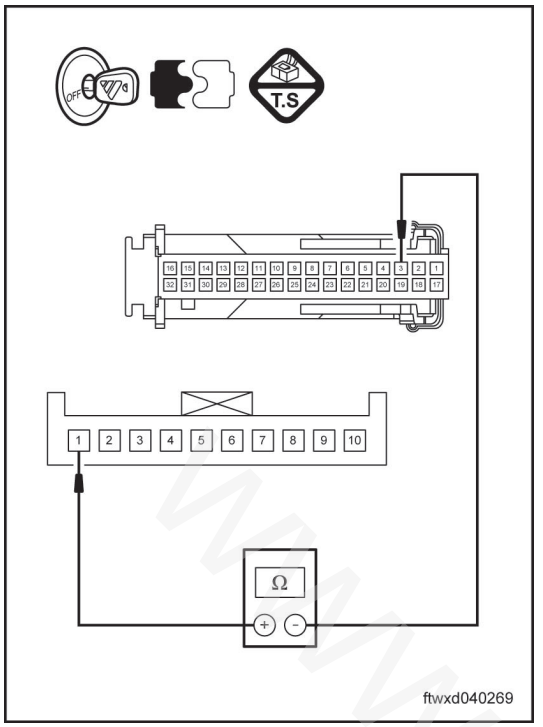
(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
C012(1)-C035(D3)	< 2 Ω

Check whether the result is normal?

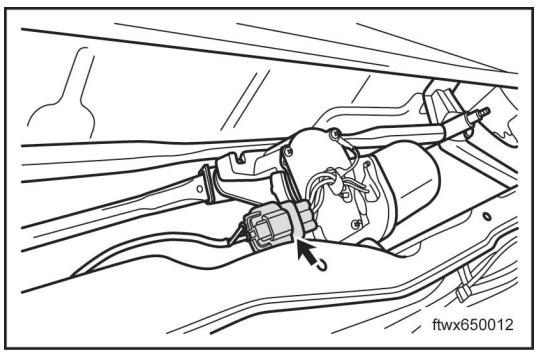
Yes> go to step 9

No > Maintenance or replace harness.

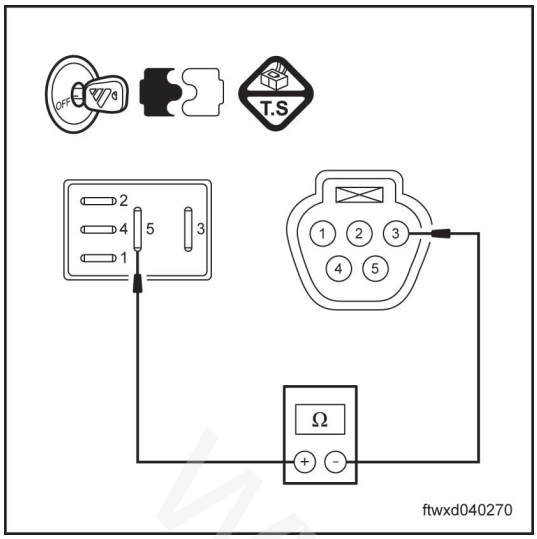
9 . Check the harness and connectors (high speed relay of front wiper – front wiper motor)

(a) Ignition Switch: OFF.

(b) Pull out the high speed relay R11 of front wiper.



(c) Disconnect the connector A007 of front wiper motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
R11（5）-A007（3）	＜2 Ω

04

Check whether the result is normal?

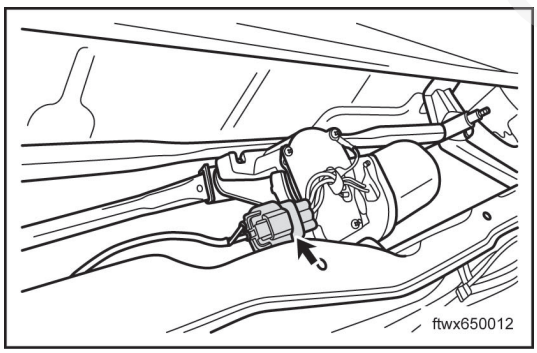
Yes> go to step 10

No > Maintenance or replace harness.

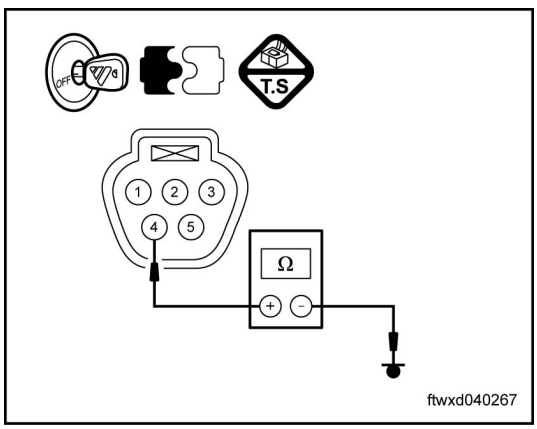
10 . Check the harness and connectors (front wiper motor- ground)

(a) Ignition Switch: OFF.

(b) Pull out the high speed relay R11 of front wiper.



(c) Disconnect the connector A007 of front wiper motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
A007 (4) - ground	＜2 Ω

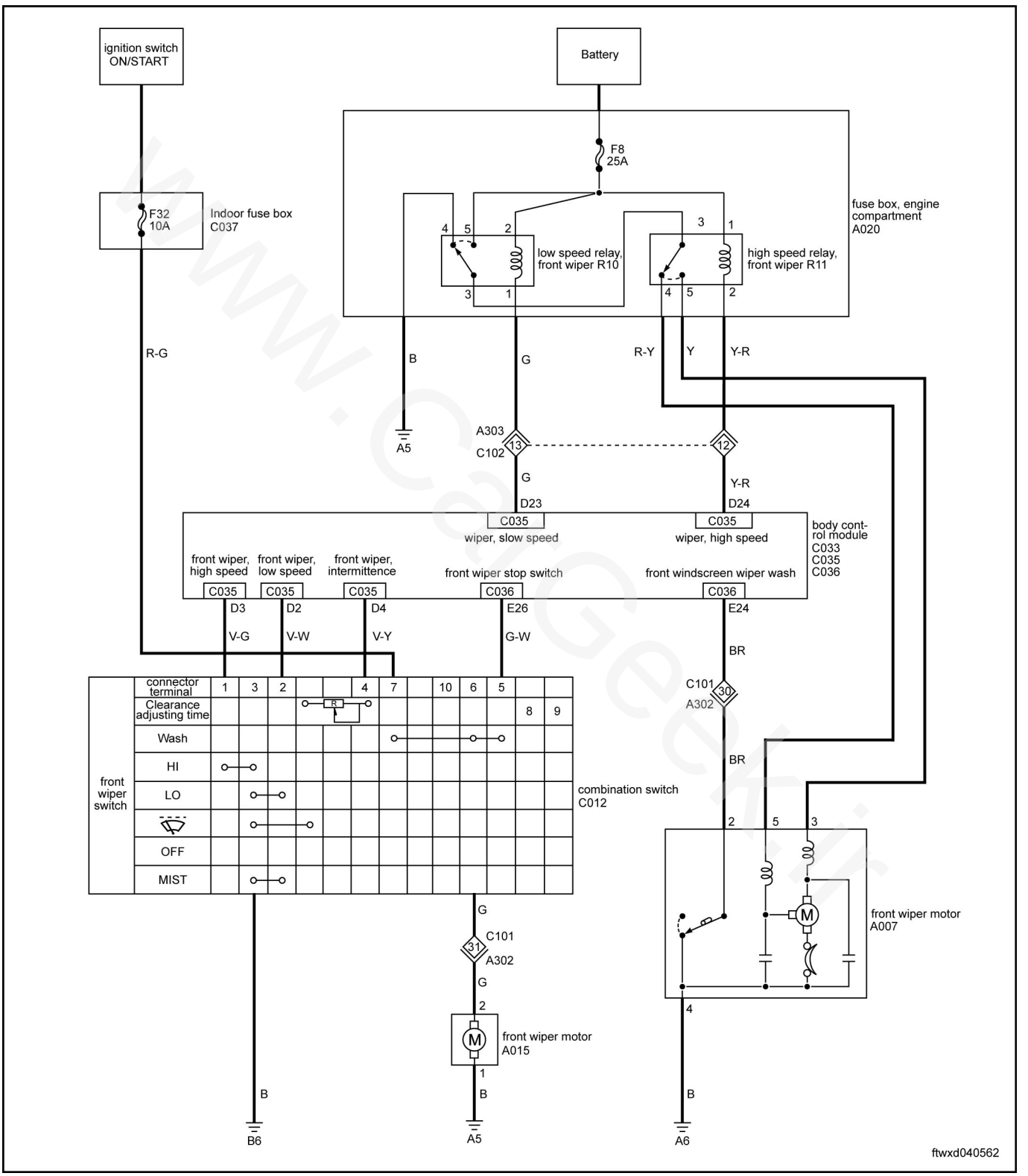
Check whether the result is normal?

No > Replace the front wiper motor.

No > Maintenance or replace harness.

B1374 LOW SPEED CONTROL CIRCUIT OF FRONT WIPER IS SUBJECTED TO HIGH CURRENT
B1373 LOW SPEED CONTROL CIRCUIT OF FRONT WIPER IS OPEN-CIRCUITED

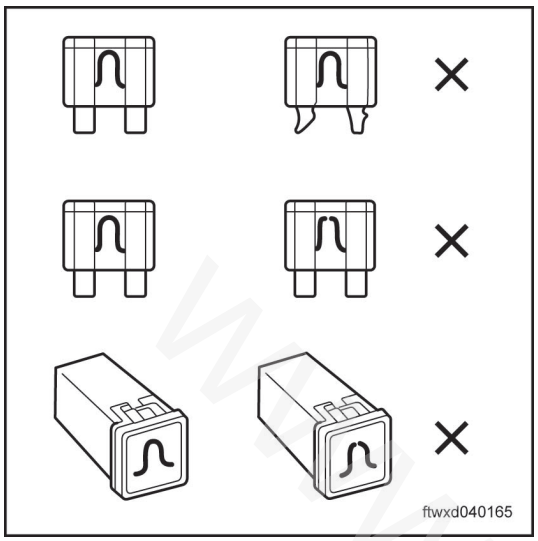
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check fuse: F8 (25A) inside interior fuse box fuse.

Check whether the result is normal?

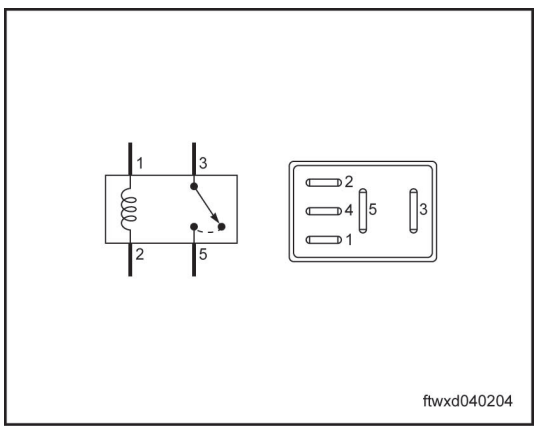
Yes> go to step 2

No> replace fuse

2 . Check the low speed relay of front wiper.

(a) Ignition Switch: OFF.

(b) Pull out the low speed relay R10 of front wiper.



(c) Measure the electrical resistance based on the value in the following form.

Standard voltage

Conditions	Multimeter connection	Standard value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitch 1 and 2,	3 - 5	< 2 Ω

Check whether the result is normal?

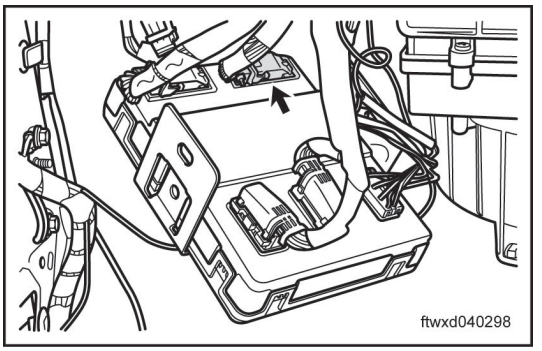
Yes> go to step 3

No > Replace the low speed relay of front wiper.

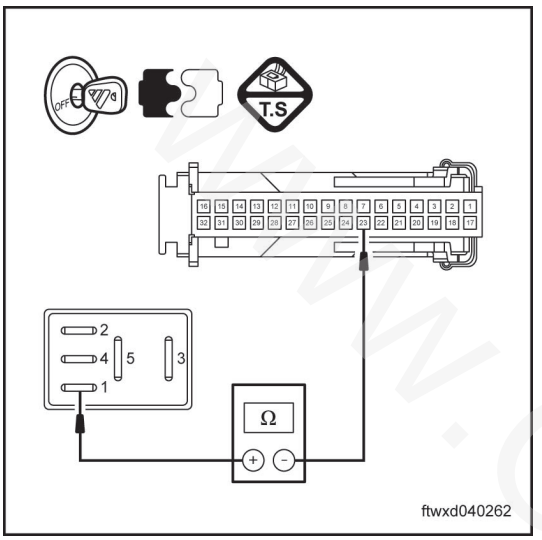
3 . Check the harness and connectors (low speed relay of front wiper - BCM control unit)

(a) Ignition Switch: OFF.

(b) Pull out the low speed relay R10 of front wiper.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
R10（2）-C035 （D23）	＜ 2 Ω

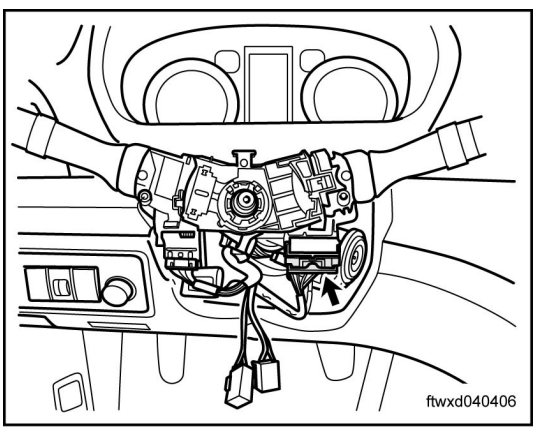
Check whether the result is normal?

Yes> go to step 4

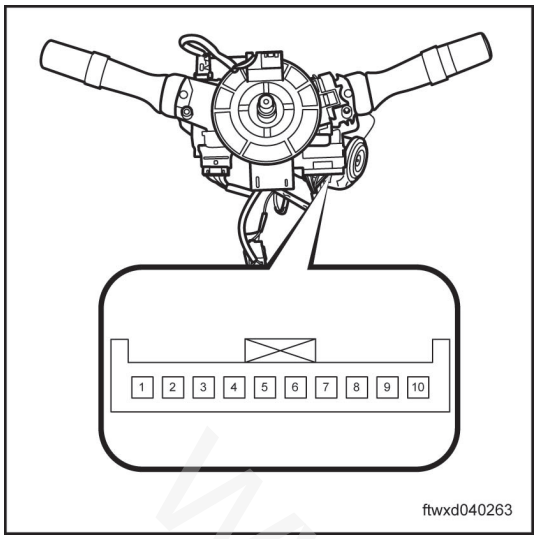
No > Maintenance or replace harness.

4 . Check the combination switch (wiper).

(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Check the combination switch (wiper).

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Switch off the wiper switch	2-3	⩾ 1 MΩ
Turn on the low-speed gear of wiper switch	2-3	＜ 2 Ω

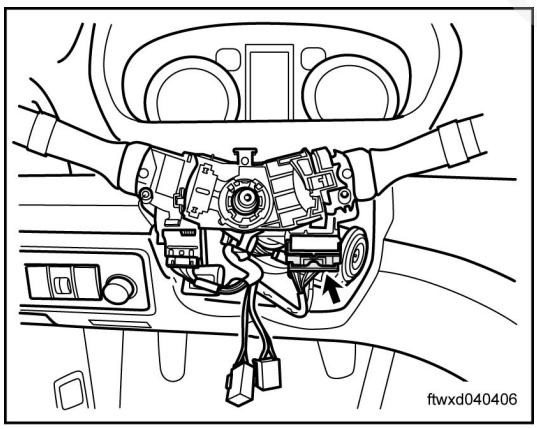
Check whether the result is normal?

Yes> go to step 5

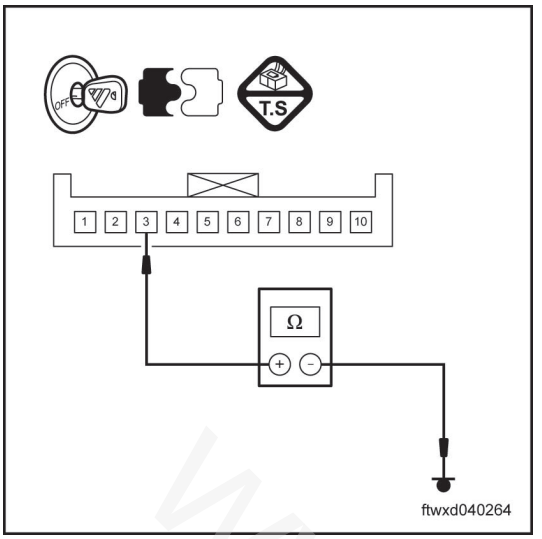
No > Replace the combination switch.

5 . Check the harness and connectors (power window switch of assistant driver’s door - BCM control unit)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
C012 (3) - ground	< 2 Ω

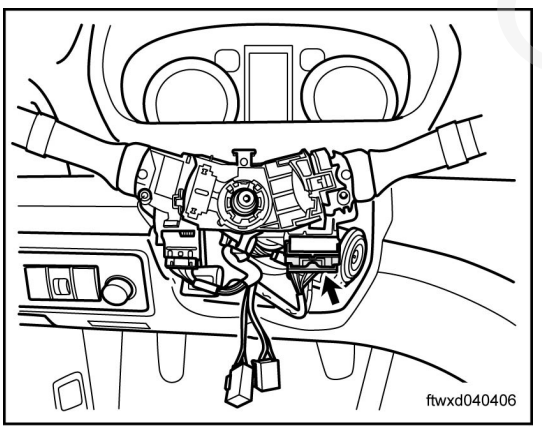
Check whether the result is normal?

Yes> go to step 6

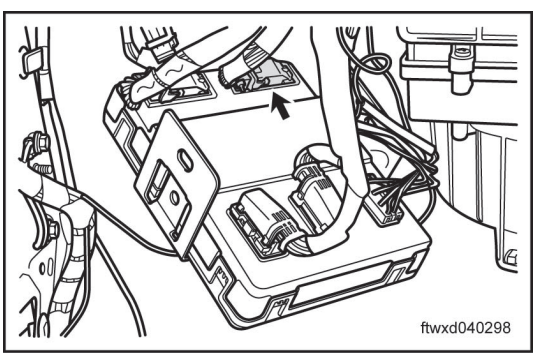
No > Maintenance or replace harness.

6 . Check the harness and connectors (combination switch - BCM control unit)

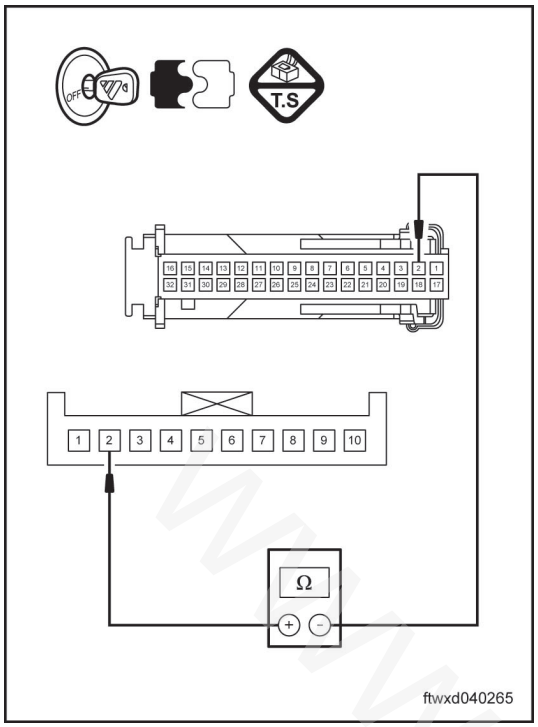
(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
C012（2）-C035（D2）	＜ 2 Ω

Check whether the result is normal?

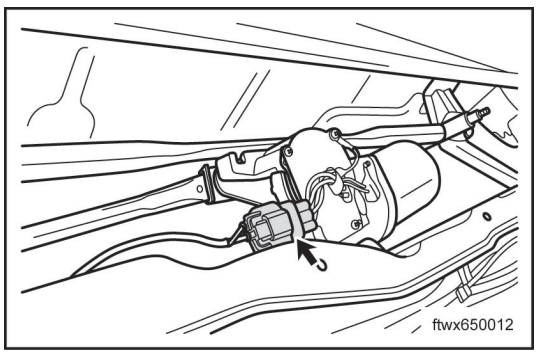
Yes> Replace BCM control unit.

No > Maintenance or replace harness.

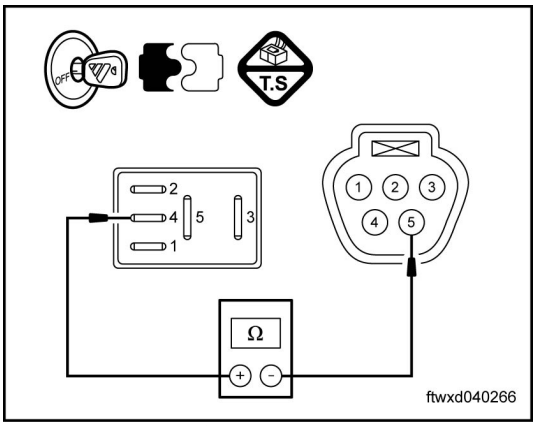
7 . Check the harness and connectors (low speed relay of front wiper – front washer motor)

(a) Ignition Switch: OFF.

(b) Pull out the low speed relay R10 of front wiper.



(c) Disconnect the connector A007 of front wiper motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
R10（5）-A007（5）	＜ 2 Ω

Check whether the result is normal?

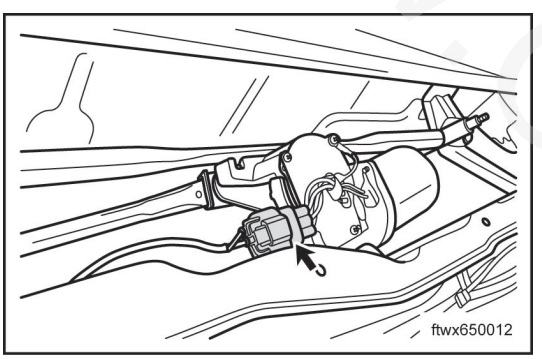
Yes> go to step 8

No > Maintenance or replace harness.

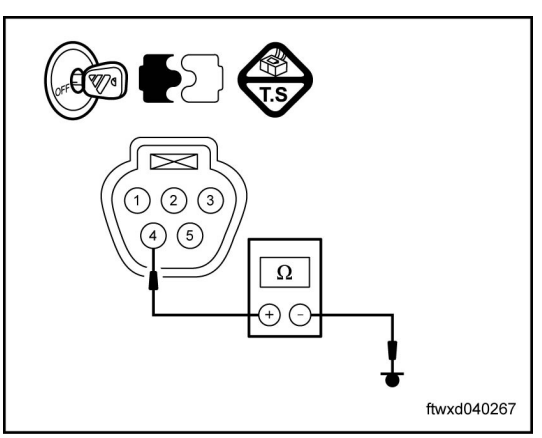
8 . Check the harness and connectors (front wiper motor- ground)

(a) Ignition Switch: OFF.

(b) Pull out the low speed relay R10 of front wiper.



(c) Disconnect the connector A007 of front wiper motor .



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is an open circuit)

Multimeter connection	Standard value
A007 (4) - ground	＜ 2 Ω

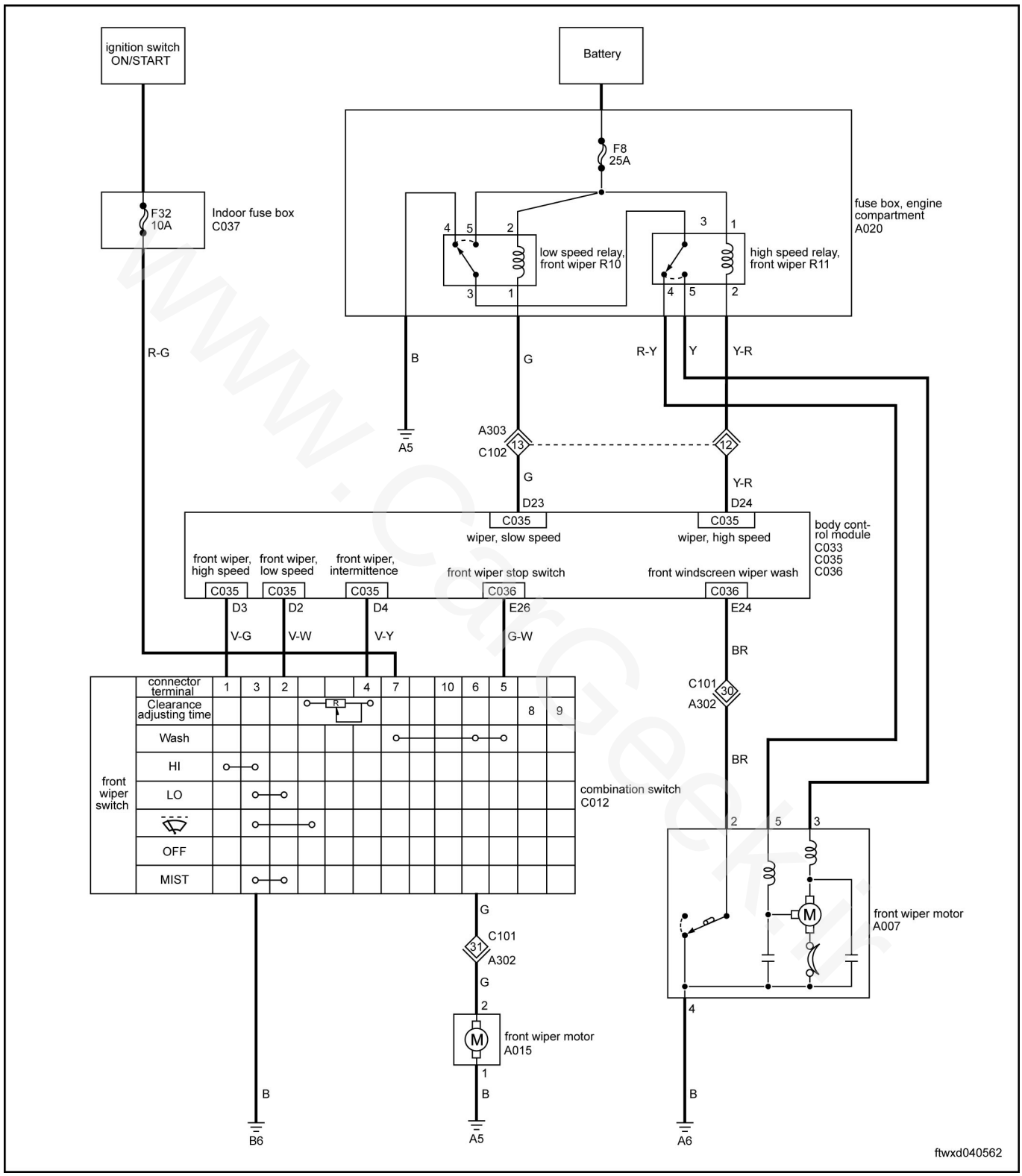
Check whether the result is normal?

No > Replace the front wiper motor.

No > Maintenance or replace harness.

FRONT WIPER DOESN'T WORK WHEN IT IS SET TO ITS INTERMITTENT GEAR

Circuit diagram



Diagnostic steps

1 . Check the low gear function of front washer motor.

(a) Ignition switch: ACC.

(b) Set the wiper and washer switch to the low-speed gear, and check the lower-speed running of front wiper motor.

Check whether the result is normal?

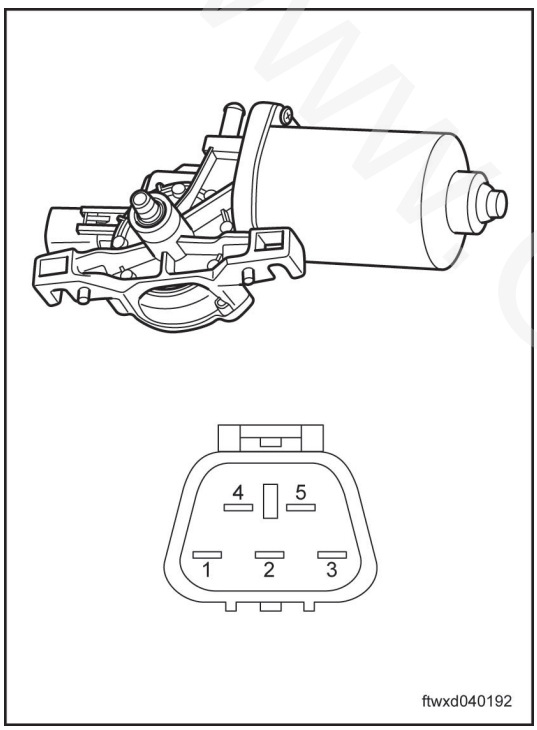
Yes> go to step 3

No> go to step 2

2 . Check the front washer motor.

(a) Ignition Switch: OFF.

(b) Disconnect the connector A007 of front wiper.



(c) Check the function of intermittent gear of front wiper motor

Conditions	Connecting pin	Specified value
Apply a battery voltage to between the pins 5 and 4	Battery (+)- 5	Low-speed running of front wiper motor
	Battery (-)- 4	

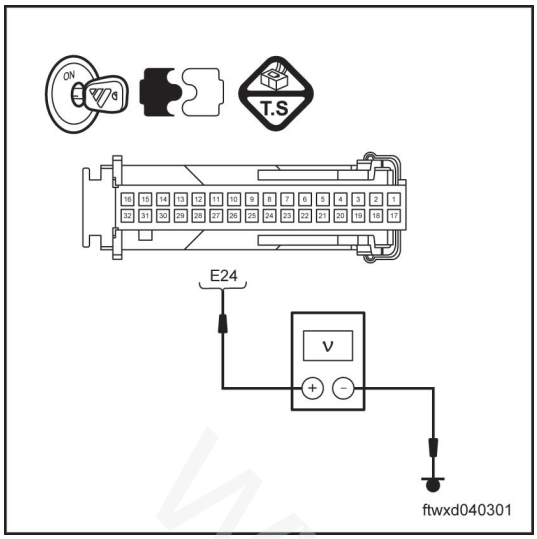
Check whether the result is normal?

Yes> go to step 3

No > Replace the motor assembly of front wiper.

3 . Check the harness and connectors (vehicle body controller -ground)

(a) Ignition Switch: ON.



(b) Use a multimeter to measure the voltage between pin E24 of connector C036 of vehicle body controller and ground.

Standard voltage

Multimeter connection	Standard value
C036 (E24) - Ground	Battery voltage

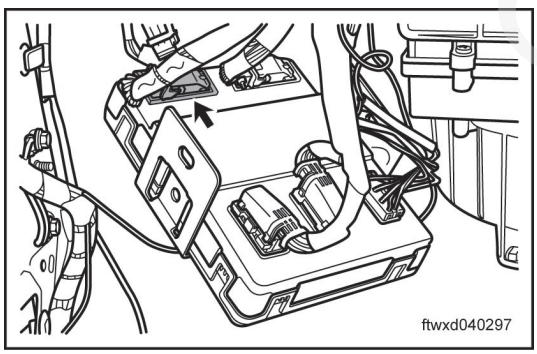
Check whether the result is normal?

Yes> go to step 4

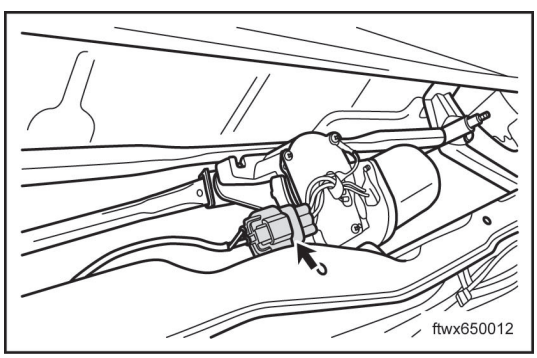
No> go to step 5

4 . Check the harness and connectors (vehicle body controller - front wiper assembly)

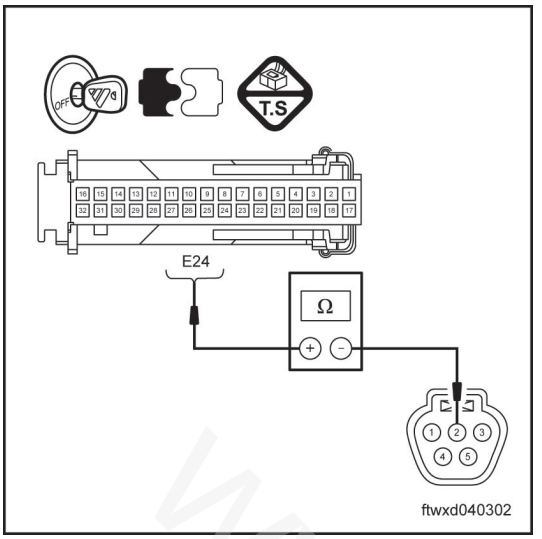
(a) Ignition Switch: OFF.



(b) Disconnect connector C036, body controller



(c) Disconnect the connector A007 of front wiper motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A007 (2）-C036（E24）	＜ 2 Ω

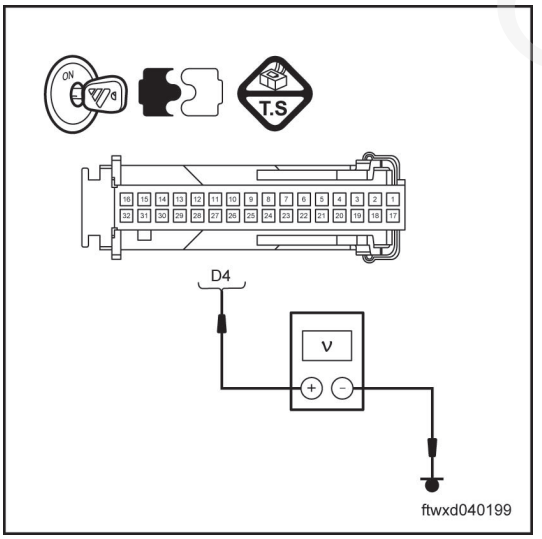
Check whether the result is normal?

Yes> go to step 5

No > Maintenance or replace harness.

5 . Check the harness and connectors (vehicle body controller -ground)

(a) Ignition Switch: ON.



(b) Use a multimeter to measure the voltage between pin D4 of connector C035 of vehicle body controller and ground.

Standard voltage

Multimeter connection	Standard value
C035 (D4) - ground	Battery voltage

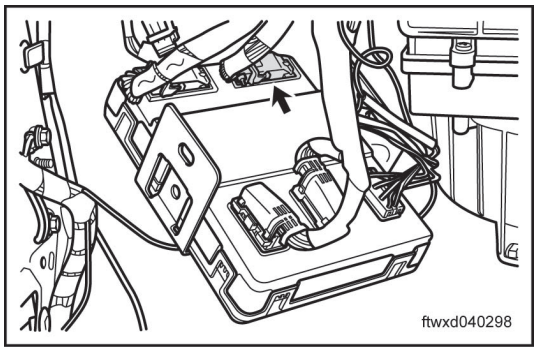
Check whether the result is normal?

Yes> go to step 6

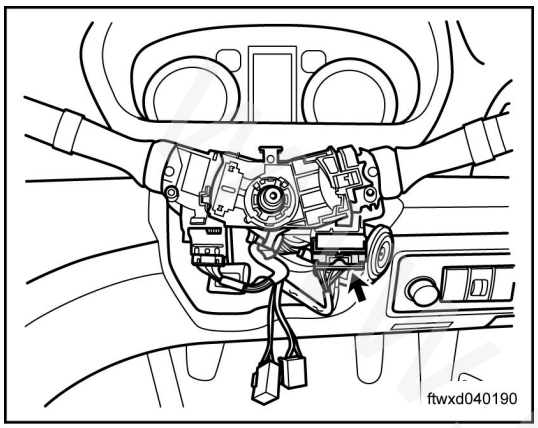
No> replace body controller

6 . Check the harness and connectors (vehicle body controller - combination switch (wiper)).

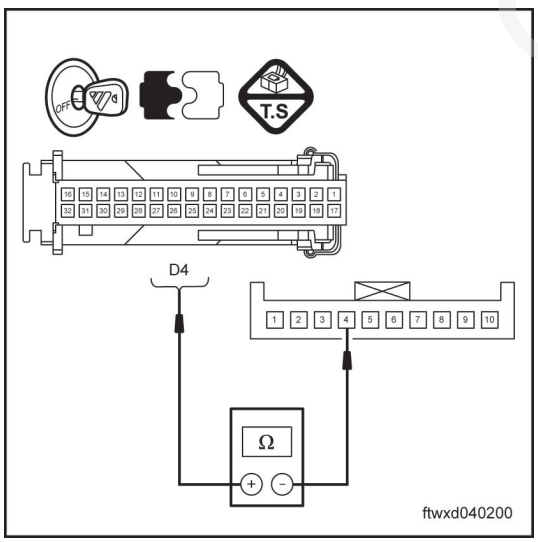
(a) Ignition Switch: OFF.



(b) Disconnect the connector C035 of the vehicle body controller.



(c) Disconnect the connector C012 of combination switch (wiper).



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C012 (4）-C035（D4）	＜ 2 Ω

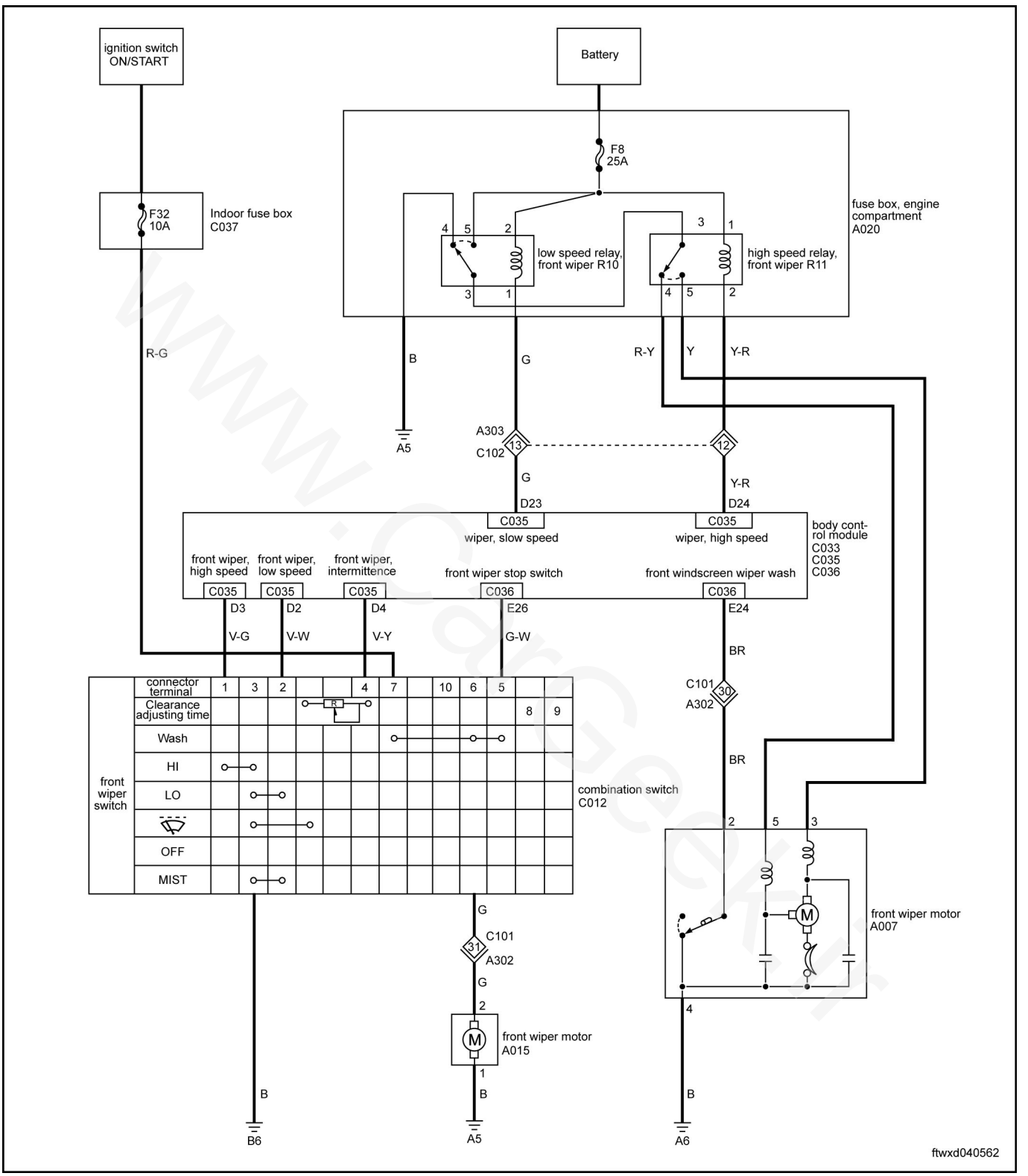
Check whether the result is normal?

Yes > Replace the combination switch.

No > Maintenance or replace harness.

FRONT WASHER DOESN'T WORK

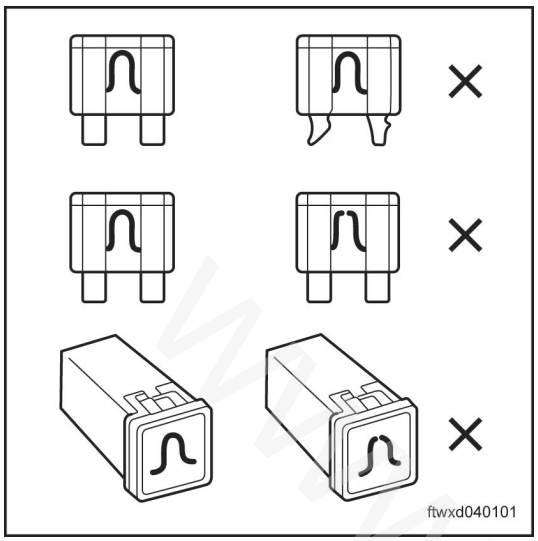
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F32 (10A) in the vehicle-borne fuse box.

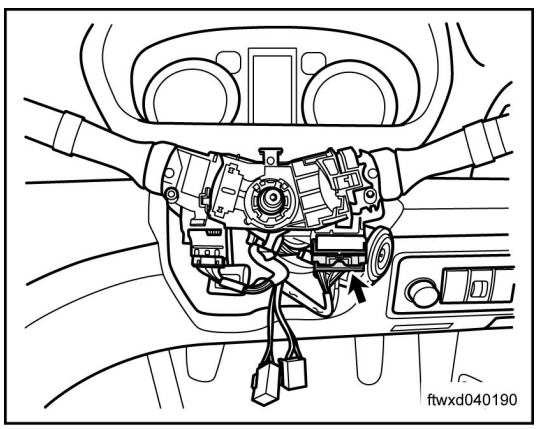
Check whether the result is normal?

Yes> go to step 2

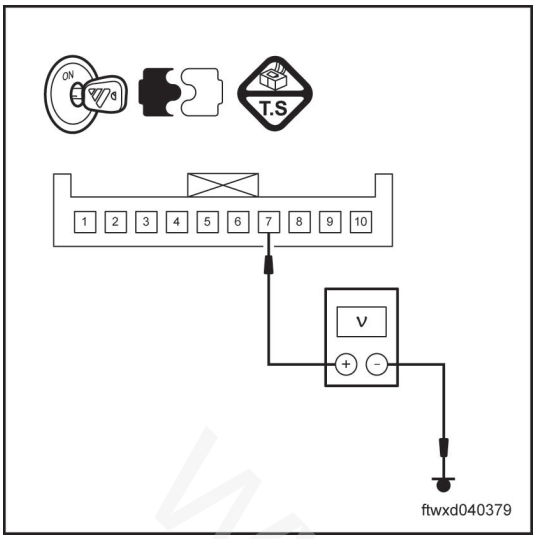
No> replace fuse

2 . Check the harness and connectors (fuse - combination switch (wiper)).

(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Standard value
C012 (7) - ground	Battery voltage

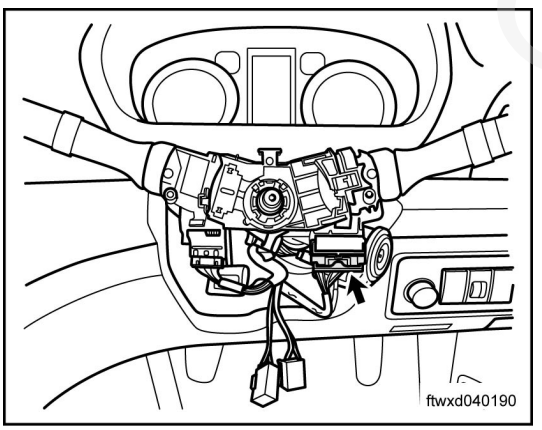
Check whether the result is normal?

Yes> go to step 3

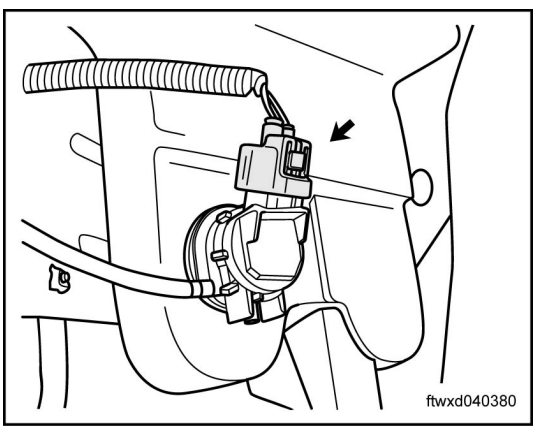
Maintain or replace the harness

3 . Check the harness and connectors (front washer motor - combination switch (wiper)).

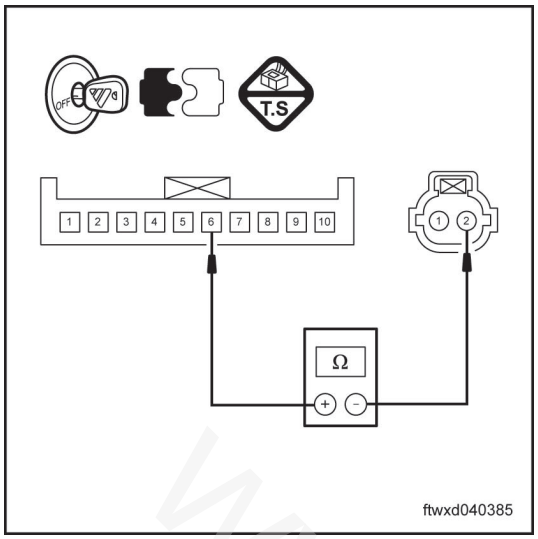
(a) Ignition Switch: OFF.



(b) Disconnect the connector C012 of combination switch (wiper).



(c) Disconnect the connector A015 of front washer motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A015 (2) - C012（6)	＜ 2 Ω

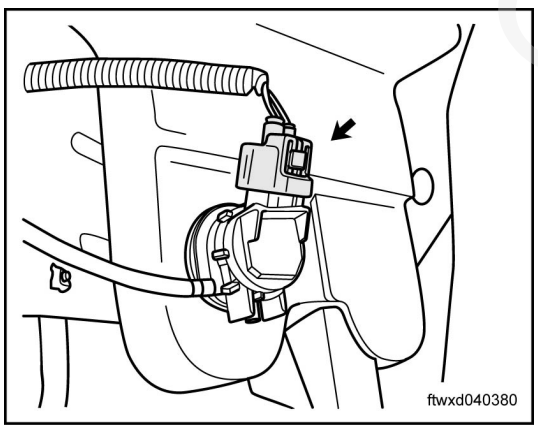
Check whether the result is normal?

Yes> go to step 4

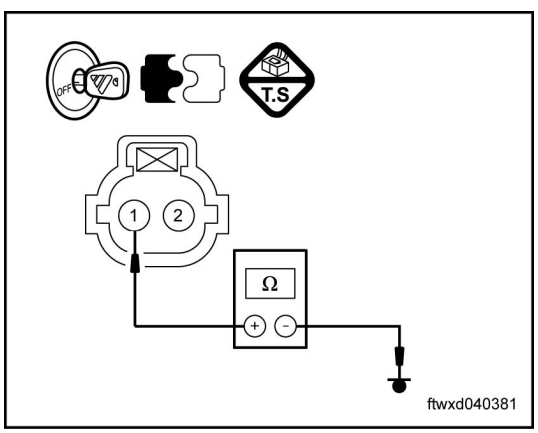
No > Maintenance or replace harness.

4 . Check the harness and connectors (front washer motor - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector A015 of front washer motor.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

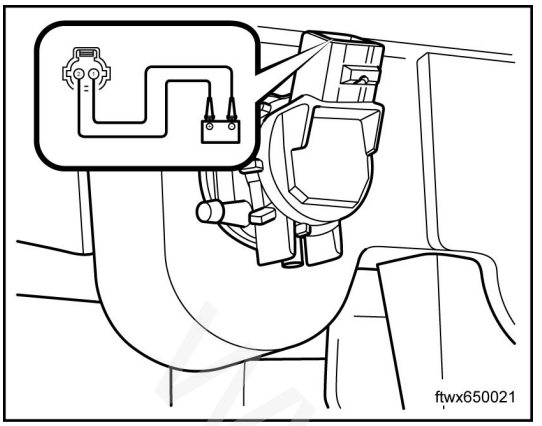
Multimeter connection	Standard value
A015 1 (1) - Ground	＜ 2 Ω

Check whether the result is normal?

Yes> go to step 5

No > Maintenance or replace harness.

5 . Check the front washer motor.



(a) Connect the battery positive terminal (+) to pin 2 of front washer motor connector.

(b) Connect the battery negative terminal (-) to pin 1 of front washer motor connector.

Check whether there is fluid coming out of the front washer motoroutlet.

Yes > Replace the combination switch (wiper).

No > Replace the front washer motor.

AIR CONDITIONING SYSTEM

PRECAUTION

1 . Do not handle refrigerant inside enclosed space or nearby open fire.

2 . Protective glasses must be worn.

3 . Be careful not to have eyes or skin exposed to liquid refrigerant.

If eyes or skin are exposed to liquid refrigerant:

(a) Rinse them with cold water with plenty of water.

(b) Apply clean vaseline onto the skin.

(c) Seek medical advice immediately or reach a hospital for professional treatment.

4 . Do not heat up a container or have it exposed to open fire.

5 . Do not allow a container to drop off or to be subjected to impact.

6 . Do not allow the compressor to work if there is not enough refrigerant inside the refrigeration system.

Lack of refrigerant inside the air conditioning system may cause inadequate lubrication and damage to compressor.

7 . Do not open the high pressure manifold valve when the compressor works.

(a) Open and close the low pressure valve only.

If the high-pressure valve is opened, the refrigerant may back flow and lead to fracture of the charging cylinder.

8 . Do not add too much refrigerant into the system.

(a) Too much refrigerant might cause the problems such as poor refrigeration performance, poor fuel economy, and engine superheating etc.

9 . Do not run the compressor when refrigerant is not available.

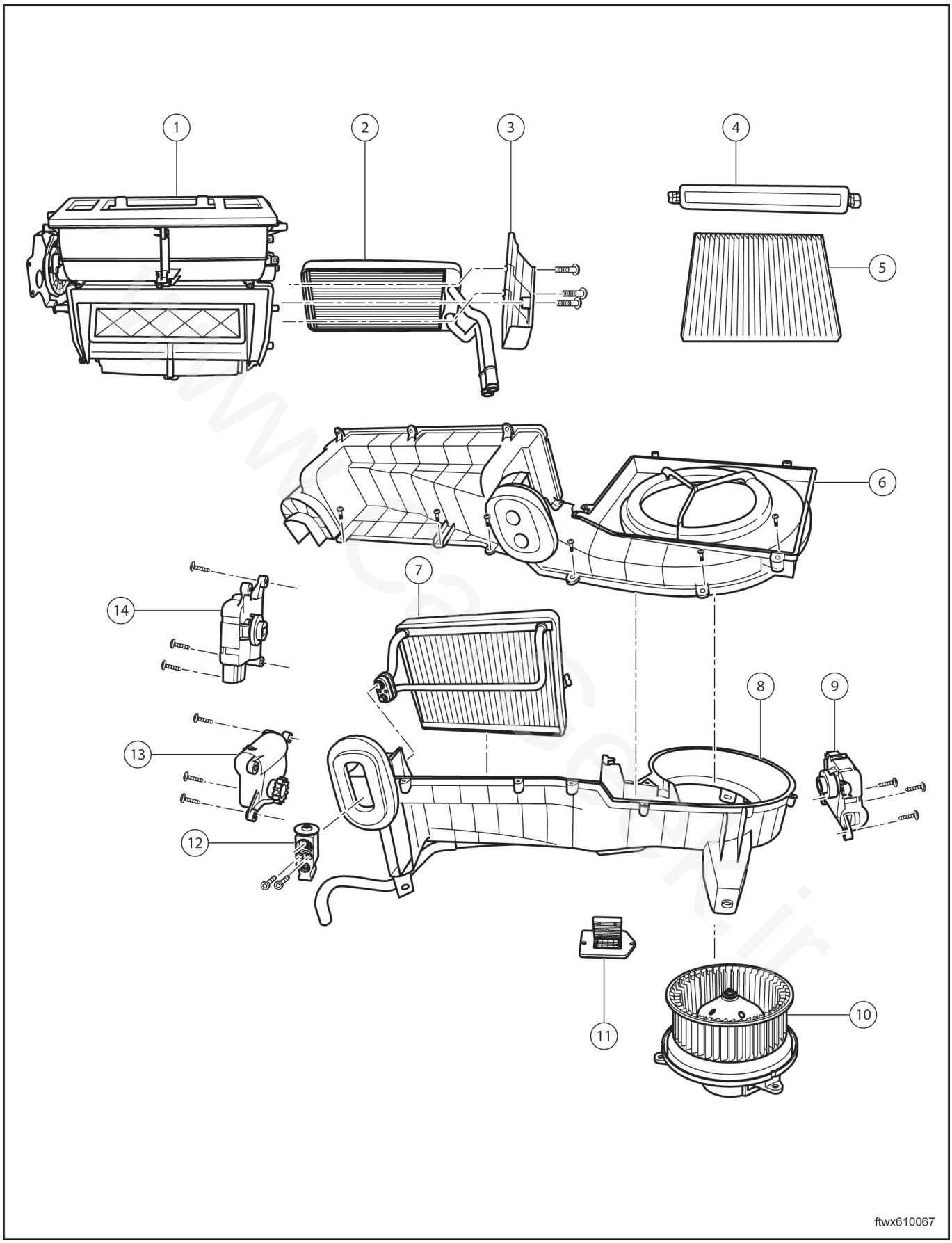
10 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

BASIC INSPECTION

Steps	Inspection contents		Measures
1	**Check for refrigerant.** • Screw off the protective cap of maintenance valve of air condition refrigeration system, and push the valve core. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Add refrigerant.
2	**Check the air condition switch.** • Turn on the air conditioner • Check in a visual manner whether the air conditioner operating indicator lamp goes on. **Check whether the result is normal?**	Yes	No> go to step 3
		No?	to Defect Phenomenon Form
3	**Check the magnetic clutch.** • Check the magnetic clutch for normal engagement. **Check whether the result is normal?**	Yes	No> go to step 4
		No?	to Defect Phenomenon Form
4	**Check the drive belt.** • Check the drive belt for slippage. **Check whether the result is normal?**	Yes	No> go to step 5
		No?	to Defect Phenomenon Form
5	**Check the compressor.** • Check whether any abnormal sound may be heard during operation of the compressor. **Check whether the result is normal?**	Yes	No> go to step 6
		No?	to Defect Phenomenon Form
6	**Check the condenser.** • Check whether there is any rubbish lying between the condenser and radiator. • Check the condenser fan for normal work. **Check the condenser for normal work.**	Yes	No> go to step 7
		No?	Remove the rubbish or replace the condenser fan
7	**Check the pipeline and circuits.** • check the pipelines and circuits for any bends or twists that might cause jamming. **Check whether the result is normal?**	Yes	Go to defect phenomenon form
		No?	Lay again the pipeline and circuits

COMPONENTS DRAWING



1	Unit air heater
2	Core, unit air heater
3	Water pipe guard board, unit air heater
4	filter element baffle-plate, air conditioner
5	Filter element, air conditioner
6	Evaporator shell (upper)
7	Evaporator
8	Evaporator shell (lower)
9	Motor, circulating air door
10	Blower
11	Governing resistor
12	Expansion valve
13	Motor, cold/warm air door
14	Motor, mode air door

DEFECT PHENOMENON FORM

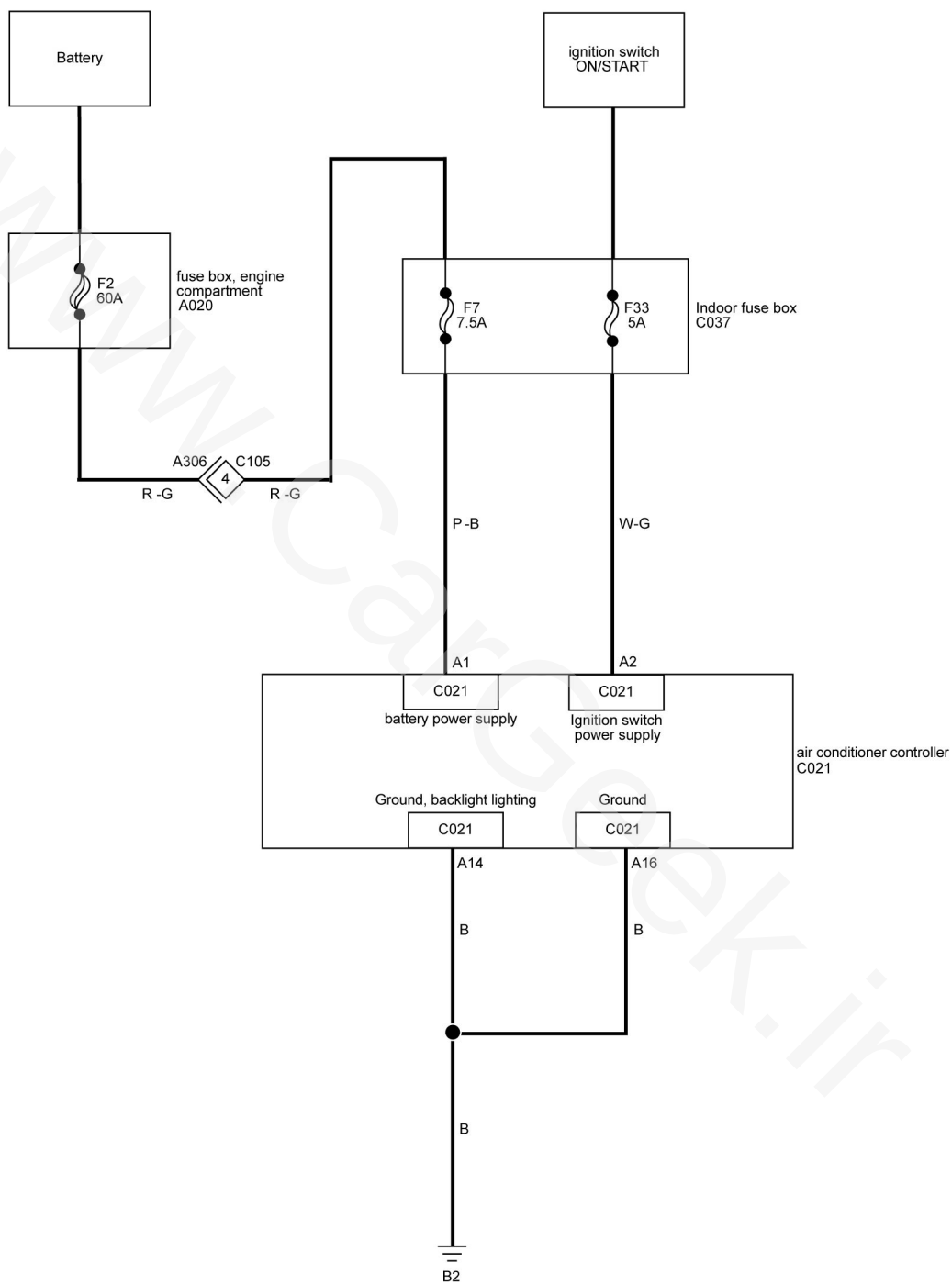
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Defect phenomenon	Suspect Area	Reference
No function of the air conditioning system works	1. Fuse	-
	2. Relay	-
	3. Air condition magnifier	Chapter 61. Heating & A/C - evaporator, replacement
	4. A/C compressor	Chapter 61. Heating & A/C - A/C compressor, replacement
	5. Harness	-
Air output control: Blower does not work	1. Fuse	-
	2. Relay	-
	3. Blower switch	Chapter 61. Heating & A/C - blower, replacement
	4. Governing resistor of blower	Chapter 61. Heating & A/C - blower, replacement
	5. Blower motor	Chapter 61. Heating & A/C - blower, replacement
	6. Air conditioner controller	Chapter 61. Heating & A/C - control mechanism, replacement
	7. Harness	-
Air output control: Air exhaust is inadequate	1. Blower switch	Chapter 61. Heating & A/C - blower, replacement
	2. Governing resistor of blower	Chapter 61. Heating & A/C - blower, replacement
	3. Blower motor	Chapter 61. Heating & A/C - blower, replacement
	4. Air conditioner controller	Chapter 61. Heating & A/C - control mechanism, replacement
	5. Front air outlet	Chapter 61. Heating & A/C - instrument board air passage, replacement
	6. Harness	-

Defect phenomenon	Suspect Area	Reference
Refrigerating system: Failure to refrigerate	1. Fuse	-
	2. Relay	-
	3. A/C compressor	Chapter 61. Heating & A/C - A/C compressor, overhaul
	4. Air conditioner controller	Chapter 61. Heating & A/C - control mechanism, replacement
	5. Air condition magnifier	Chapter 61. Heating & A/C - evaporator, replacement
	6. Refrigerant	-
	7. Air condition pipeline	Chapter 61. Heating & A/C - A/C pipeline, replacement
	8. Harness	-
Failure of servo motor of mode air door	1. Fuse	-
	2. Motor, air-conditioner air door	Chapter 61. Heating & A/C - A/C air door motor, replacement
	3. Harness	-
Failure of temperature regulation servo motor	1. Fuse	-
	2. Temperature regulation servo motor	Chapter 61. Heating & A/C - unit air heater, replacement
	3. Harness	-

NO FUNCTION OF THE AIR CONDITIONING SYSTEM WORKS

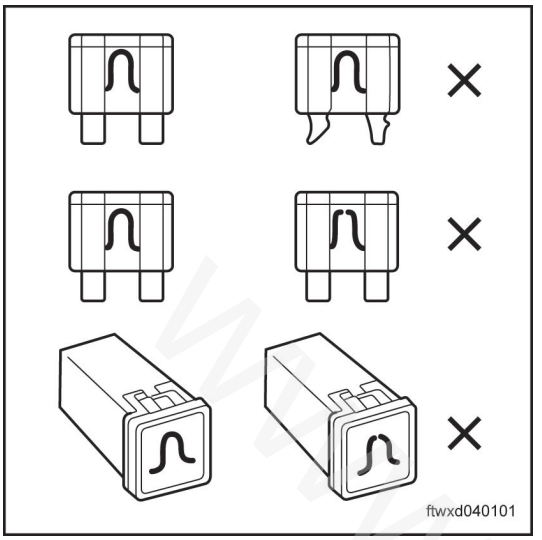
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check the fuse inside the fuse box of engine compartment:

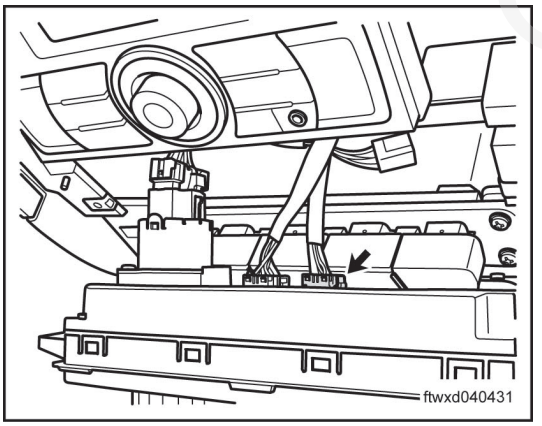
- F2（60A）

(c) Check the fuse inside the vehicle-body fuse box:

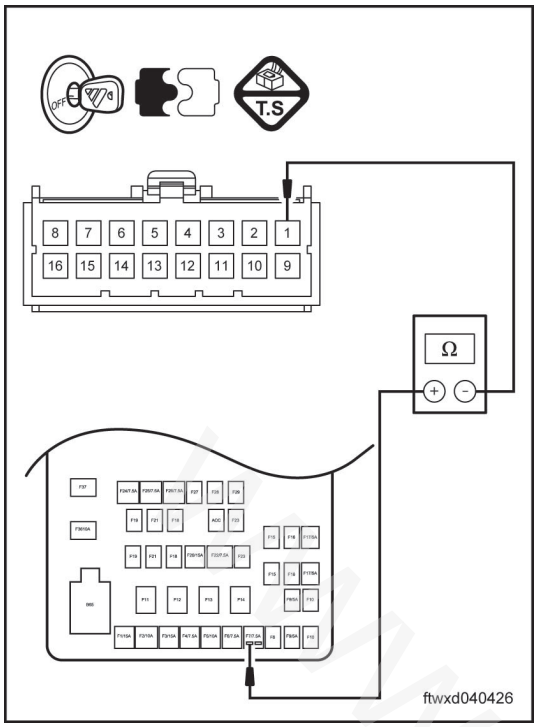
- F7（7.5A）
- F33（5A）

2 . Check harness and connectors (vehicle-body fuse F7- air conditioner controller)

(a) Disconnect battery negative cable.



(b) Disconnect connector C021 of air-conditioner controller.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F7（7.5A）—C021（A1）	＜ 2 Ω

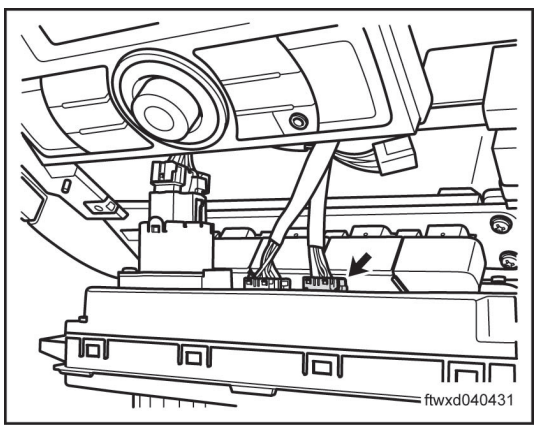
Check whether the result is normal?

Yes> go to step 3

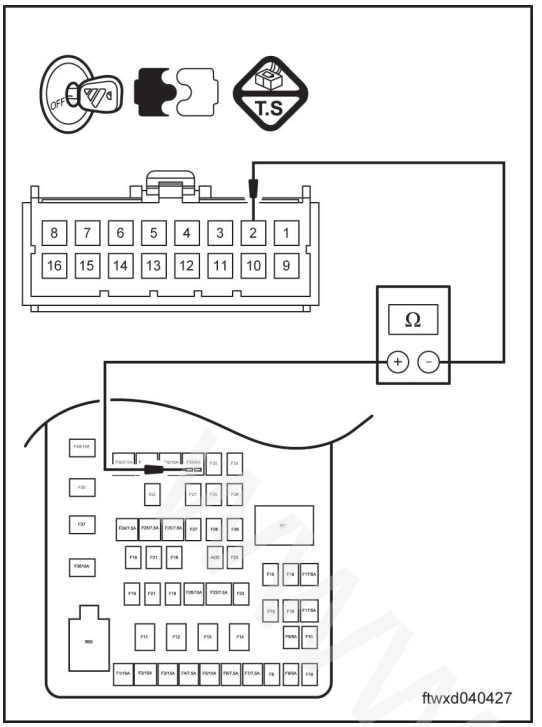
No > Maintenance or replace harness.

3 . Check harness and connectors (vehicle-body fuse F33- air conditioner controller)

(a) Disconnect battery negative cable.



(b) Disconnect connector C021 of air-conditioner controller.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F33（5A）—C021（A1）	＜ 2 Ω

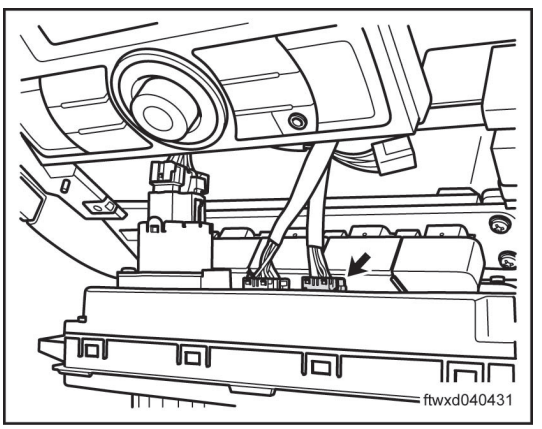
Check whether the result is normal?

Yes> go to step 10

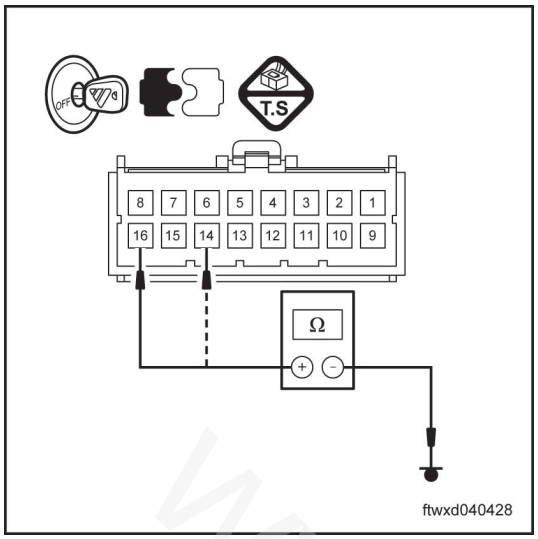
No > Maintenance or replace harness.

4 . Check the harness and connectors (air conditioner controller -ground)

(a) Disconnect battery negative cable.



(b) Disconnect connector C021 of air-conditioner controller.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C021 (A14) - ground	< 2 Ω
C021 (A16) - ground	

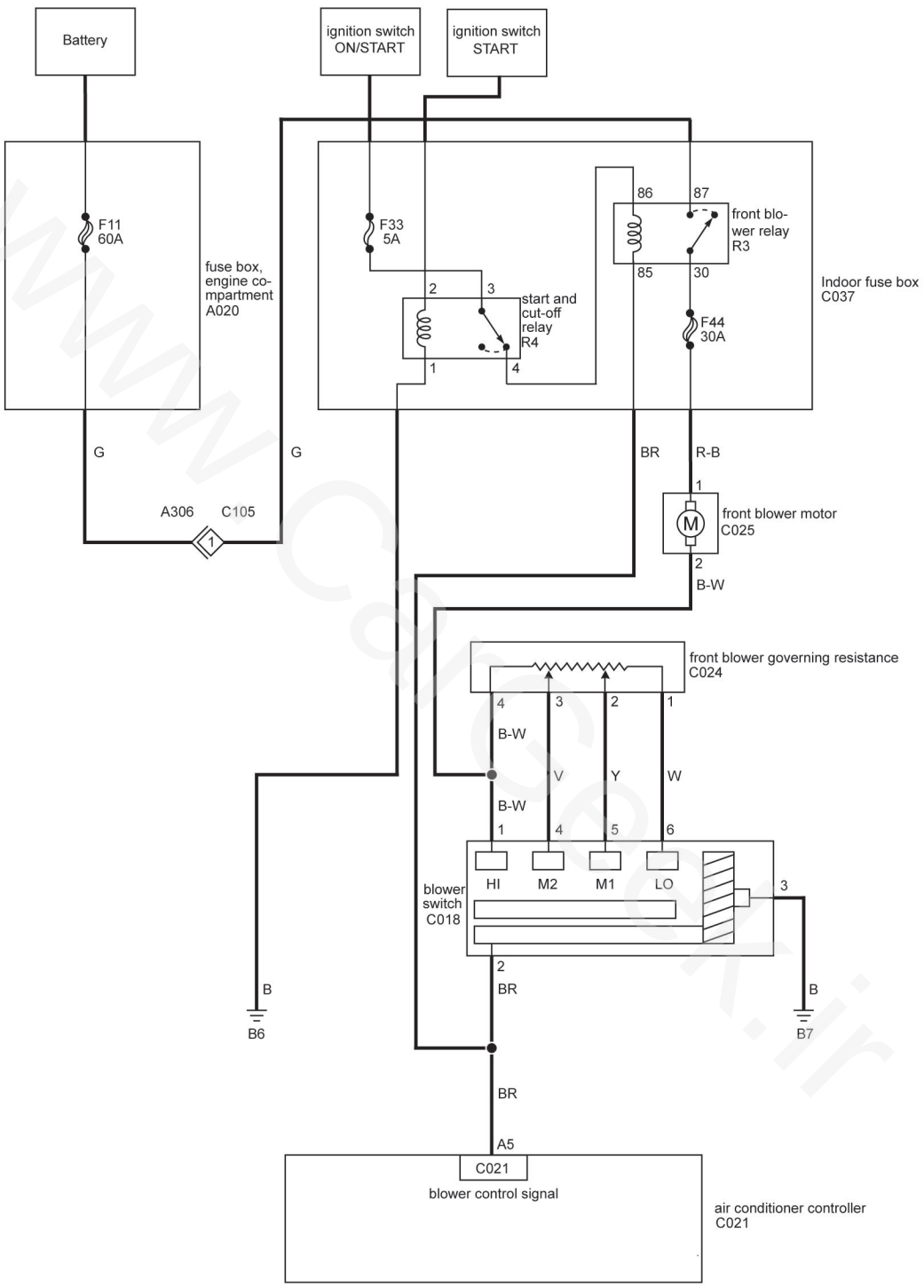
Check whether the result is normal?

Yes > Replace the air conditioner controller, and verify again whether the failure exists.

No > Maintenance or replace harness.

BLOWER DOES NOT WORK

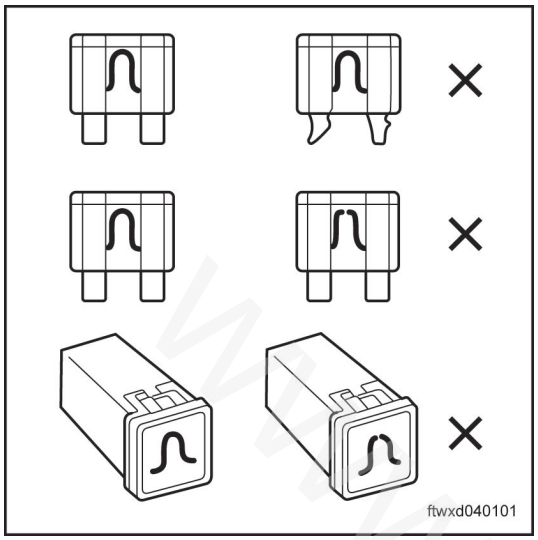
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check the fuse inside the fuse box of engine compartment:

- F11（60A）

(c) Check the fuse inside the vehicle-body fuse box:

- F33（5A）
- F44（30）

Check whether the result is normal?

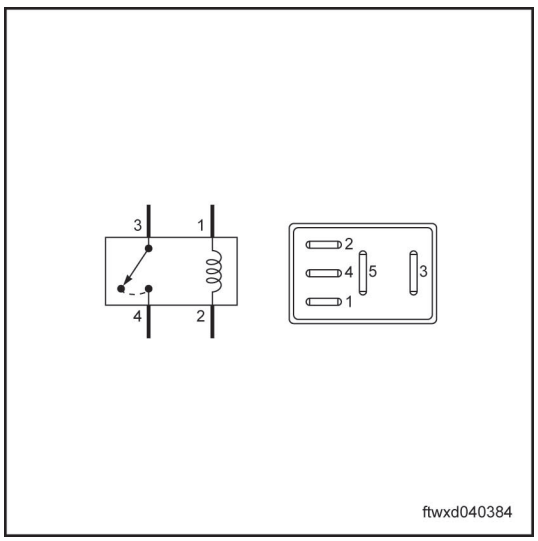
Yes> go to step 2

No> replace fuse

2 . Check the starter relay

(a) Disconnect battery negative cable.

(b) Unplug the relay R4 of starter.



(c) Check the relay R4 of no-load starter.

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1-2	Breakover
Apply power supply voltage to position between stitch 3 and 4,	3-4	＜2Ω

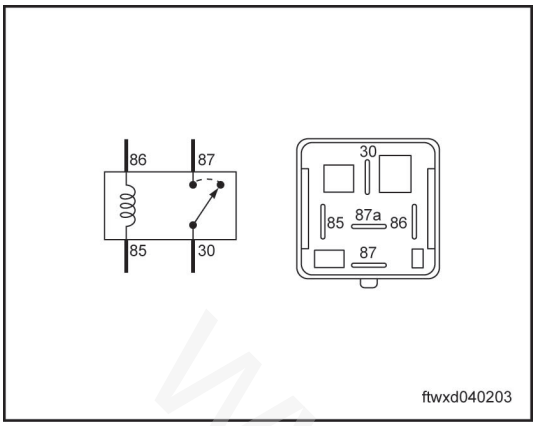
Check whether the result is normal?

Yes> go to step 3

No > Replace the starter relay, and verify again whether the failure exists.

3 . Check the blower relay

(a) Disconnect battery negative cable.
(b) Unplug the blower relay R3.



(c) Check the blower relay R3.

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	85 – 86	Breakover
Apply power supply voltage to position between stitch 85 and 86,	30 – 87	＜2 Ω

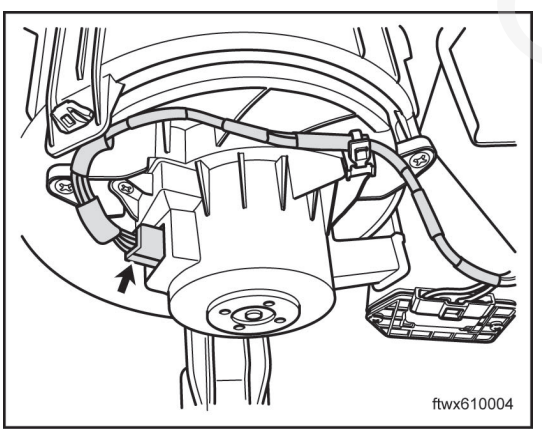
Check whether the result is normal?

Yes> go to step 4

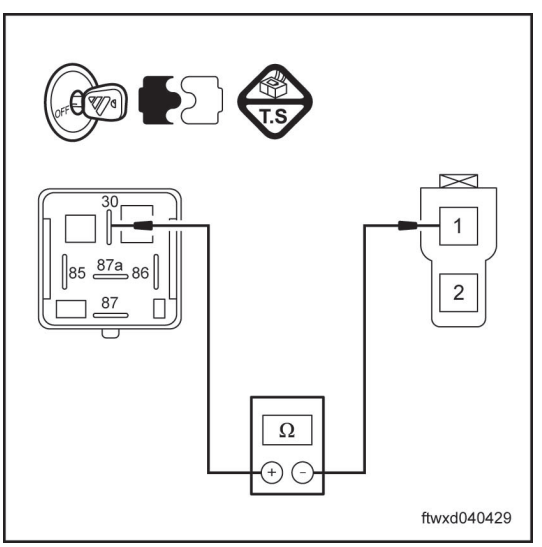
No > Replace the blower relay, and verify again whether the failure exists.

4 . Check the harness and connectors (blower relay – blower motor)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C025 of blower.
(c) Unplug the blower relay R3.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R3（30）—C025（1）	＜ 2 Ω

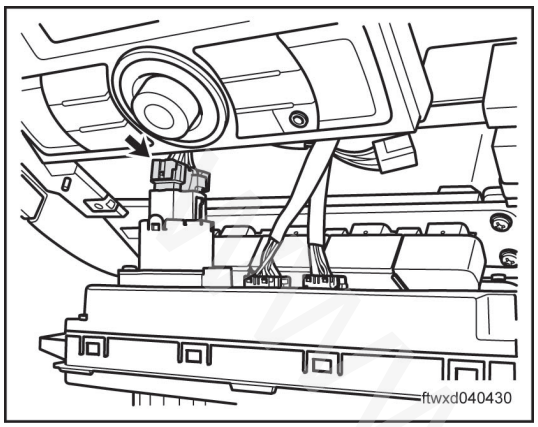
Check whether the result is normal?

Yes> go to step 5

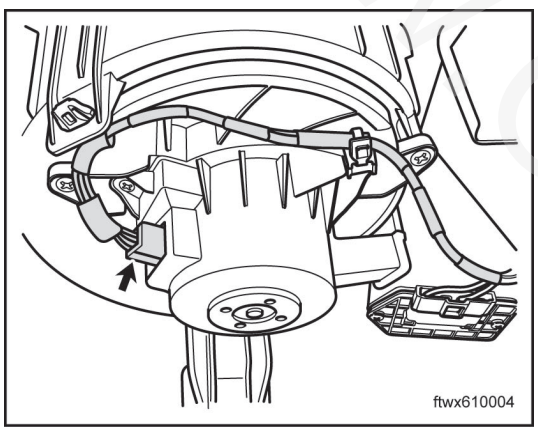
No > Maintenance or replace harness.

5 . Check the harness and connectors (blower motor – blower switch)

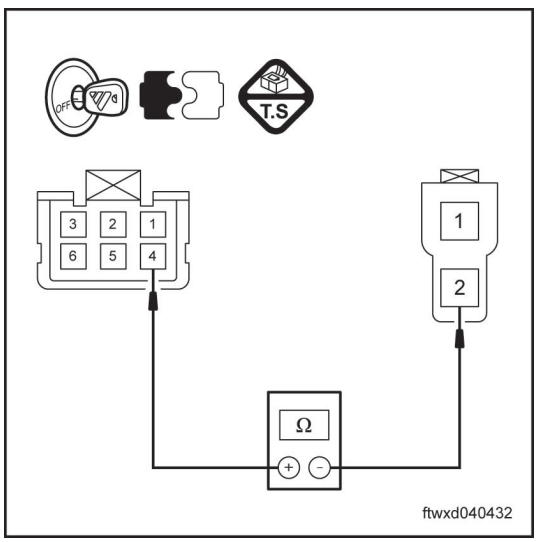
(a) Disconnect battery negative cable.



(b) Disconnect the connector C018 of blower switch.



(c) Disconnect the connector C025 of front blower.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

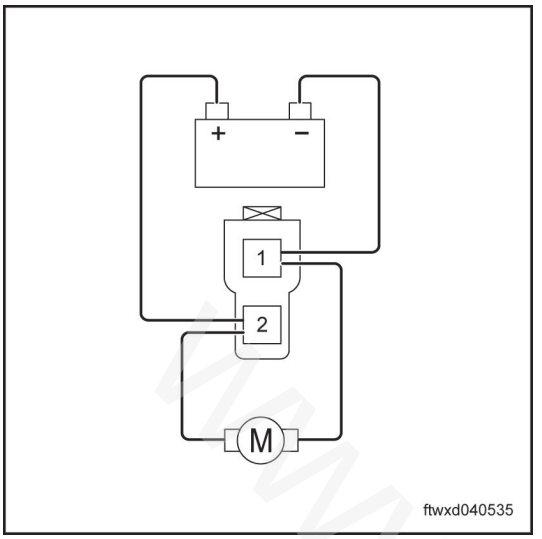
Multimeter connection	Standard value
C025（2）—C018（1）	＜2Ω

Check whether the result is normal?

Yes> go to step 6

No > Maintenance or replace harness.

6 . Check the blower motor



(a) Connect the battery positive terminal (+) to pin 2 of blower motor connectors.

(b) Connect the battery negative terminal (-) to pin 1 of blower motor connectors.

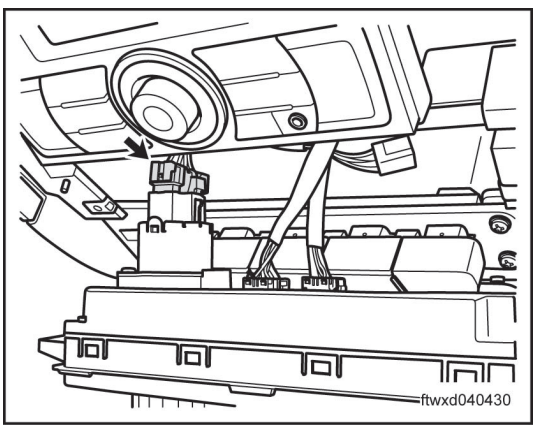
Check whether the result is normal?

Yes> go to step 7

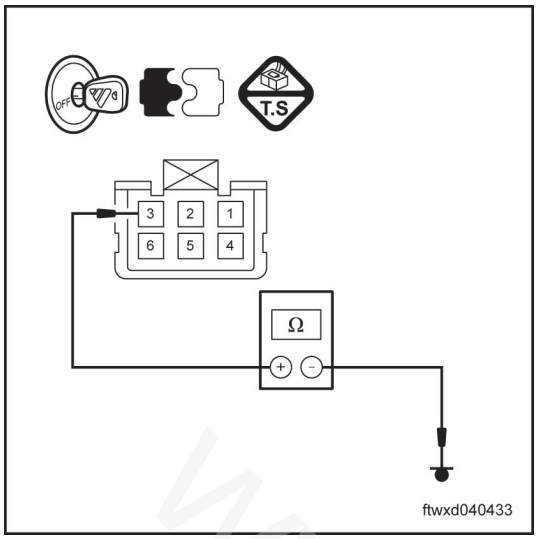
No > Replace the blower motor, and verify again whether the failure exists.

7 . Check the harness and connectors (blower switch - ground)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C018 of blower switch.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C018 (3) - ground	＜2Ω

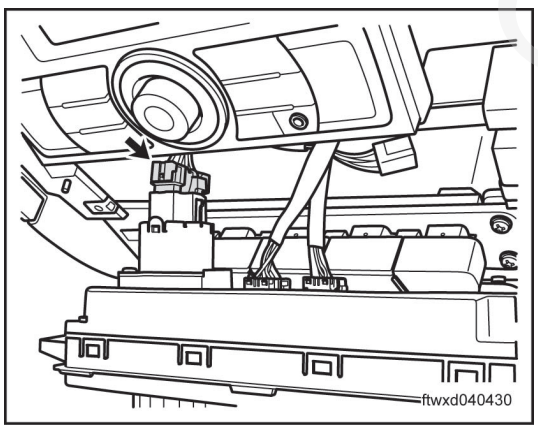
Check whether the result is normal?

Yes> go to step 6

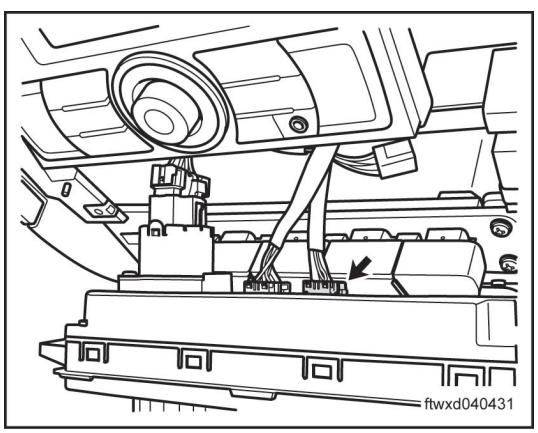
No > Maintenance or replace harness.

8 . Check the harness and connectors (blower switch - air conditioner controller)

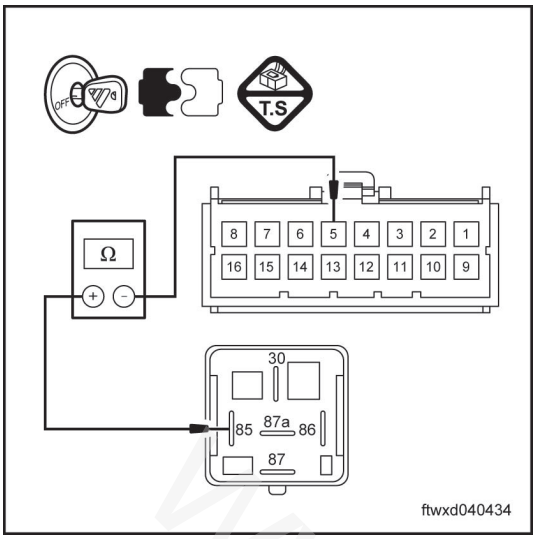
(a) Disconnect battery negative cable.



(b) Disconnect the connector C018 of blower switch.



(c) Disconnect the connector C021 of front air conditioner controller.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C018（2）—C021（A5）	＜2Ω
C018（2）—R3（85）	

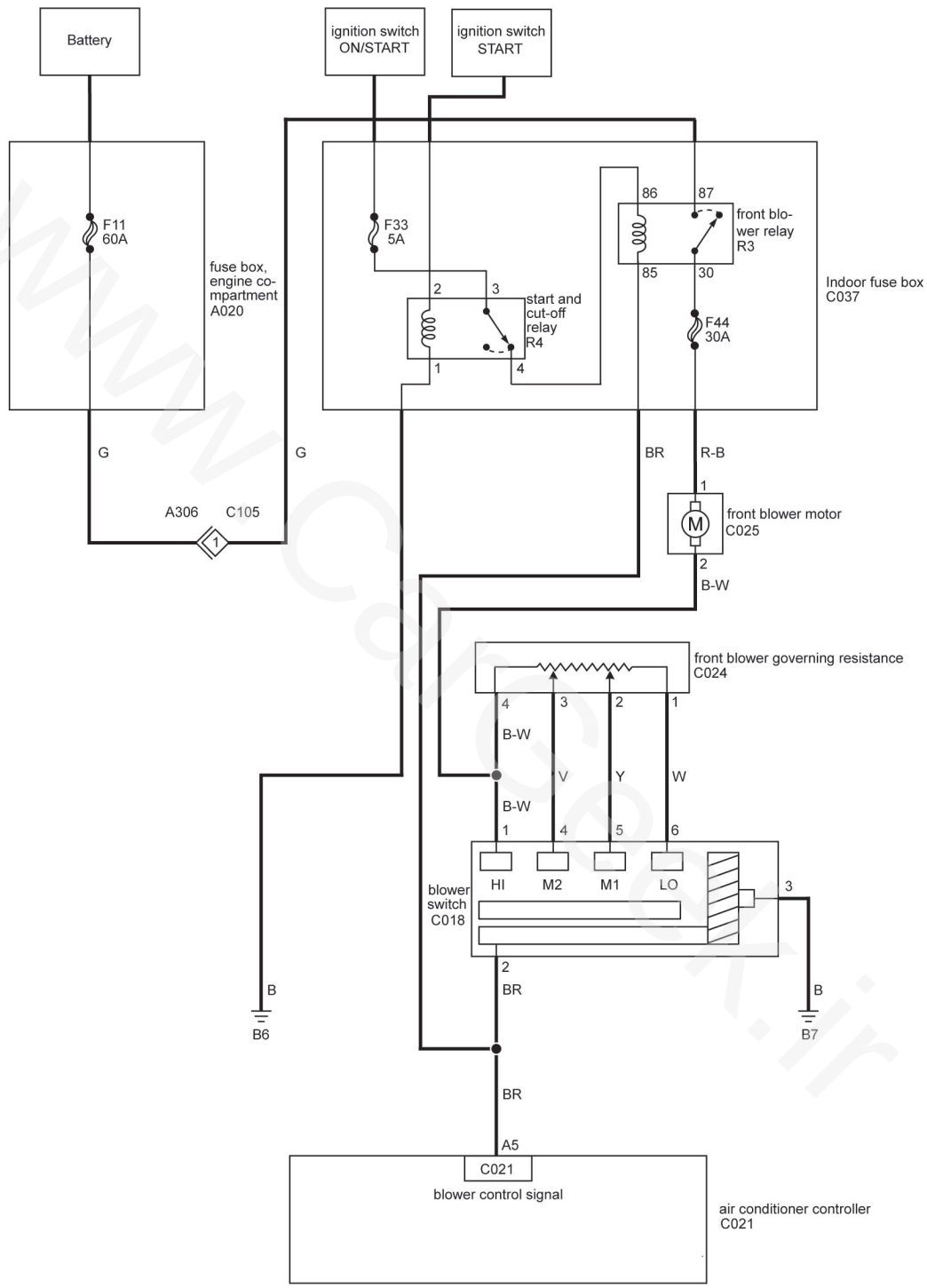
Check whether the result is normal?

Yes > Replace the blower switch, and verify again whether the failure exists.

No > Maintenance or replace harness.

AIR OUTPUT CONTROL: AIR EXHAUST IS INADEQUATE

Circuit diagram



ftwxd040563

Diagnostic steps

1 . Check the governing resistor of blower

(a) Disconnect battery negative cable.

(b) Replace the governing resistor of blower.

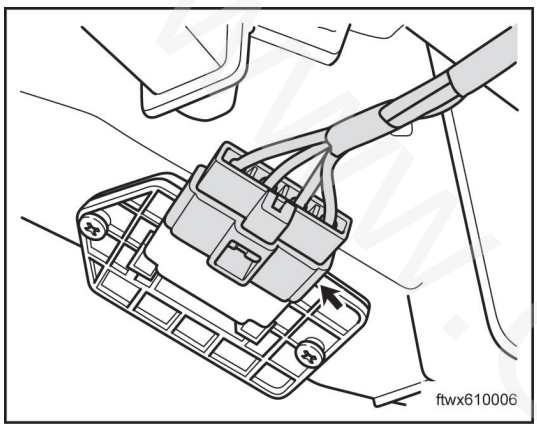
Check whether the result is normal?

Yes> go to step 2

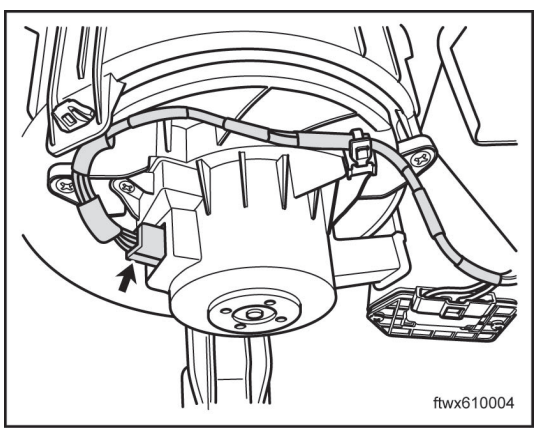
No > Replace the blower governing resistor, and verify again whether the failure exists.

2 . Check the harness and connectors (blower motor – blower governing resistor)

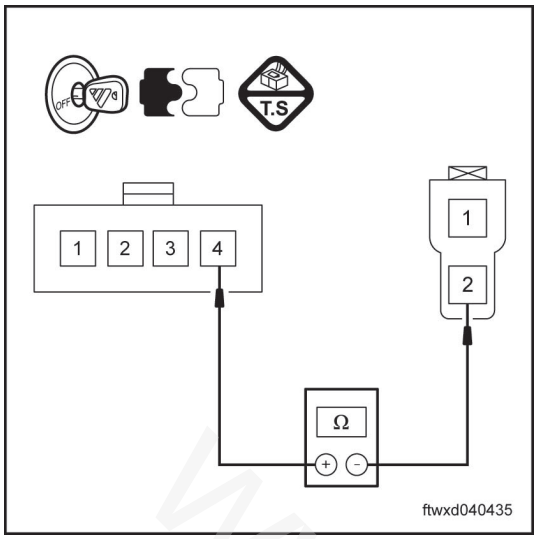
(a) Disconnect battery negative cable.



(b) Disconnect the connector C024 of blower governing resistor.



(c) Disconnect the connector C025 of blower motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C025（2）—C024（4）	＜ 2 Ω

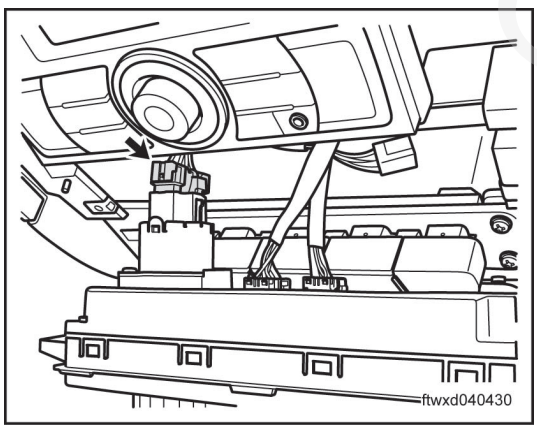
Check whether the result is normal?

Yes> go to step 3

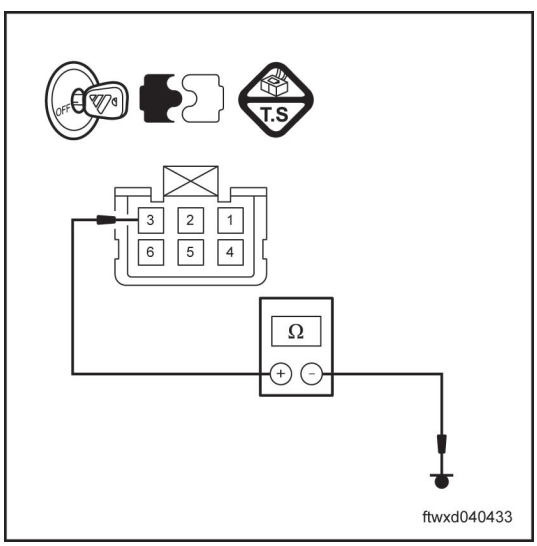
No > Maintenance or replace harness.

3 . Check the harness and connectors (blower switch - ground)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C018 of blower switch.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C018 (3) - ground	＜2 Ω

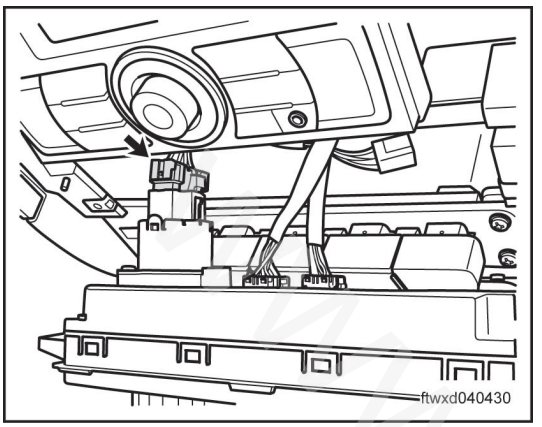
Check whether the result is normal?

Yes> go to step 4

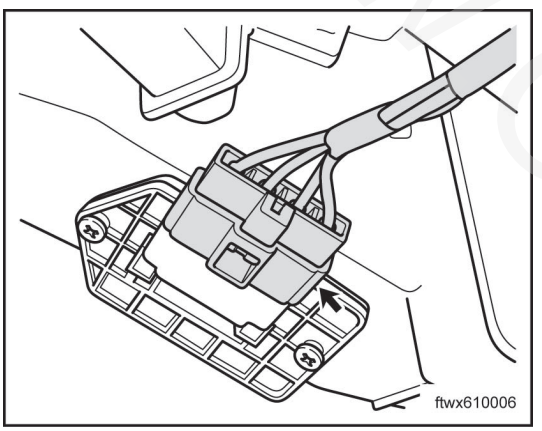
No > Maintenance or replace harness.

4 . Check the harness and connectors (blower governing resistor – blower switch)

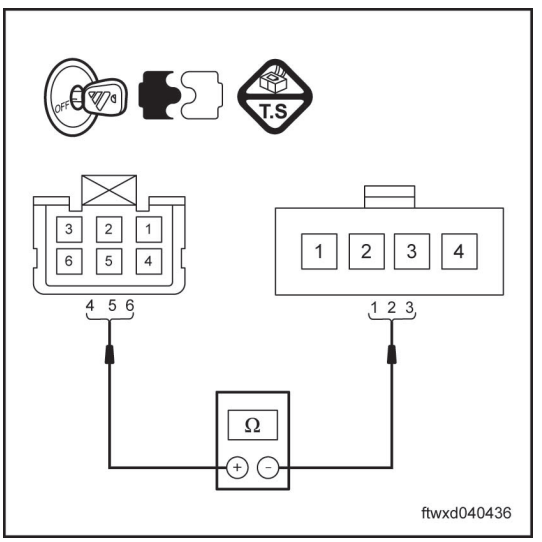
(a) Disconnect battery negative cable.



(b) Disconnect the connector C018 of blower switch.



(c) Disconnect the connector C024 of blower governing resistor.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C024（1）—C018（6）	＜2 Ω
C024（2）—C018（5）	
C024（3）—C018（4）	

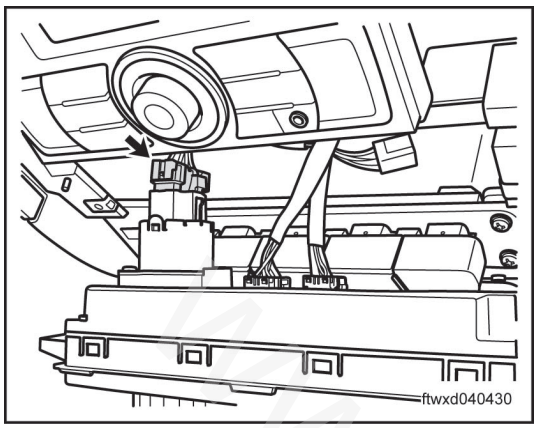
Check whether the result is normal?

Yes> go to step 5

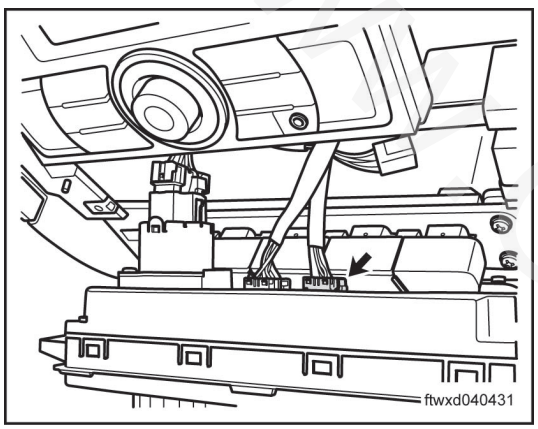
No > Maintenance or replace harness.

5 . Check the harness and connectors (blower switch - air conditioner controller)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C018 of blower switch.



(c) Disconnect the connector C021 of front air conditioner controller.

(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C018（2）—C021（A5）	＜2Ω

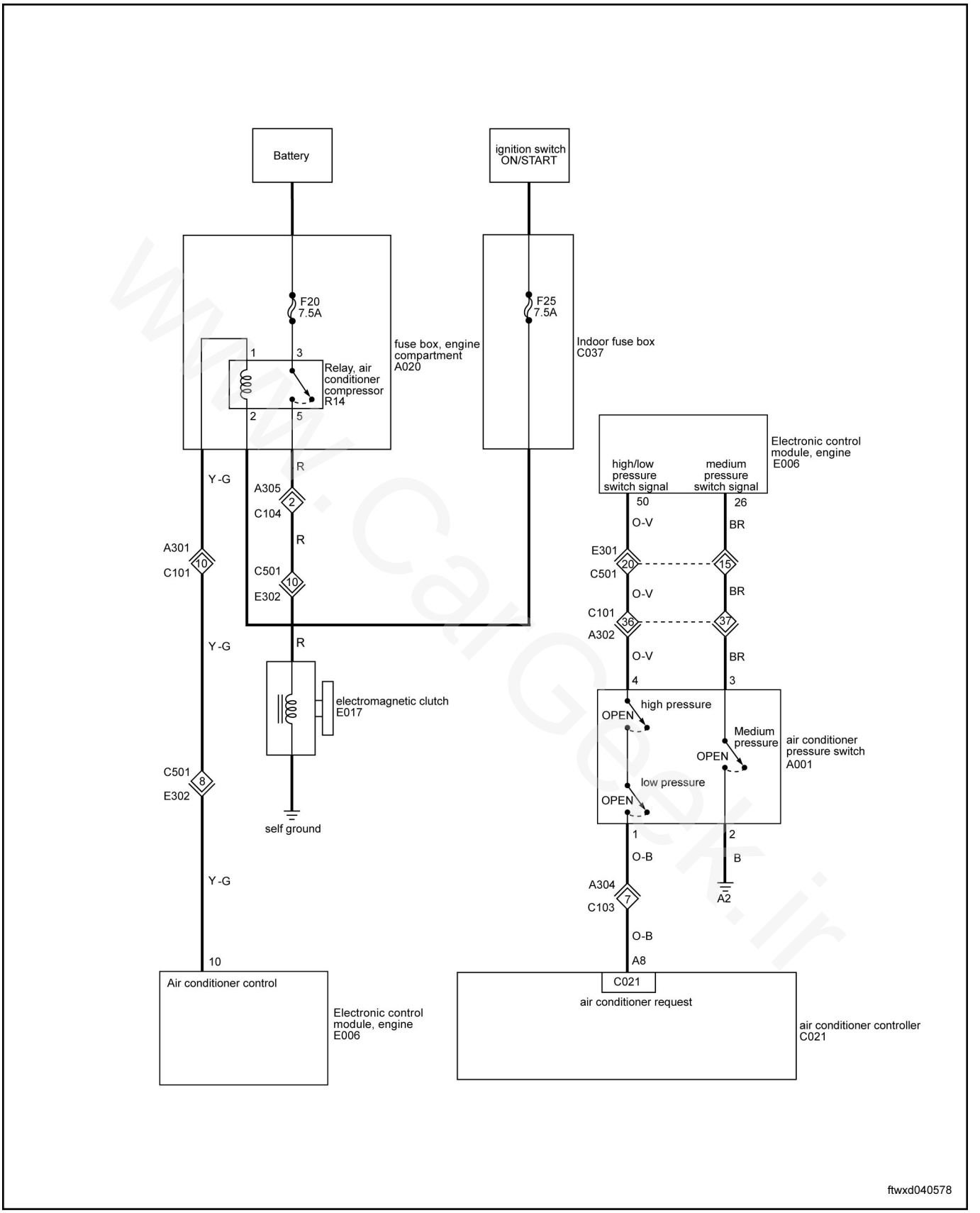
Check whether the result is normal?

Yes > Replace the blower switch, and verify again whether the failure exists.

No > Maintenance or replace harness.

REFRIGERATING SYSTEM: FAILURE TO REFRIGERATE (GASOLINE)

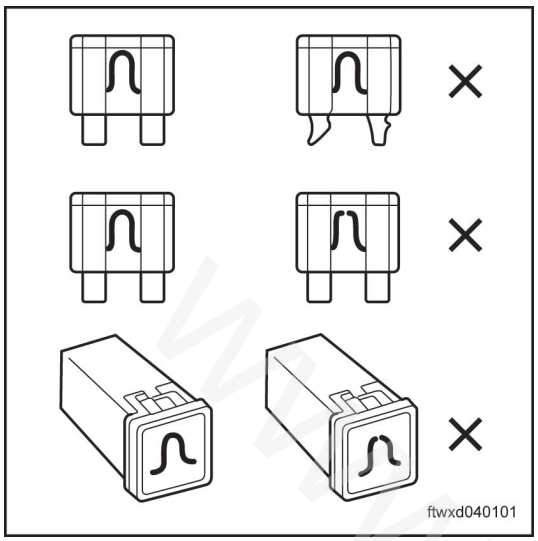
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check the fuse inside the fuse box of engine compartment:

- F20（7.5A）

(c) Check the fuse inside the vehicle-body fuse box:

- F25（7.5A）

Check whether the result is normal?

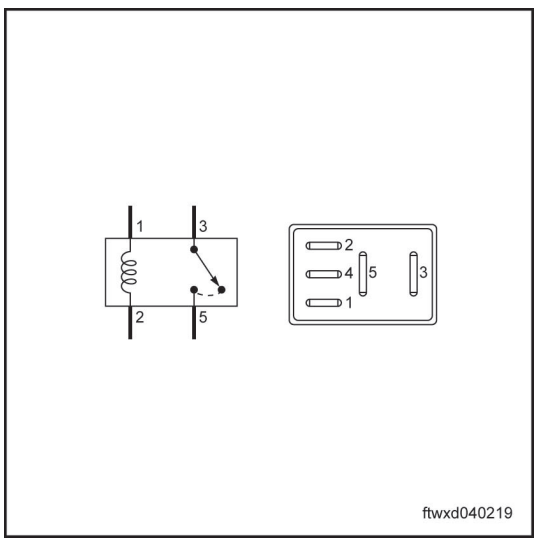
Yes> go to step 2

No> replace fuse

2 . Check the relay of air conditioner compressor

(a) Disconnect battery negative cable.

(b) Unplug the relay R14 of air conditioner compressor



(c) Check the relay of air conditioner compressor

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1-2	Breakover
Apply power supply voltage to position between stitch 3 and 5,	3-5	＜2Ω

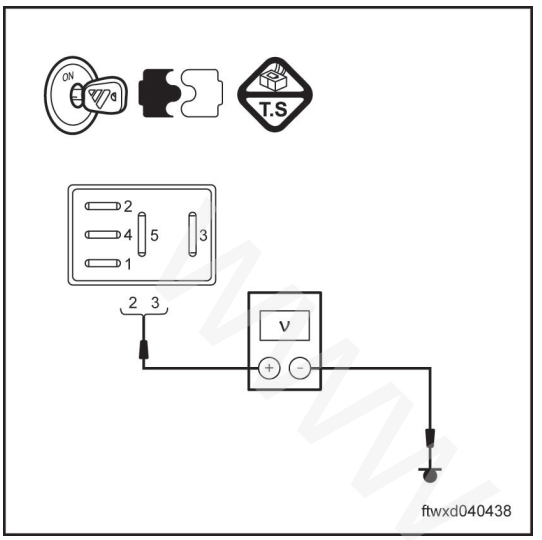
Check whether the result is normal?

Yes> go to step 3

No > Replace the relay of air conditioner compressor, and verify again whether the failure exists.

3 . Check the harness and connectors (relay of air conditioner compressor - ground)

(a) Disconnect battery negative cable.
(b) Unplug the relay of air conditioner compressor
(c) Connect battery negative cable.
(d) Start the engine.
(e) Turn on the A/C switch.



(f) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Standard value
R14 (2) - ground	Battery voltage
R14 (3) - ground	

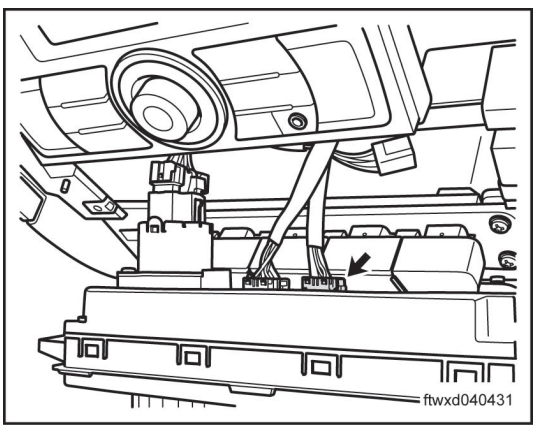
Check whether the result is normal?

Yes> go to step 4

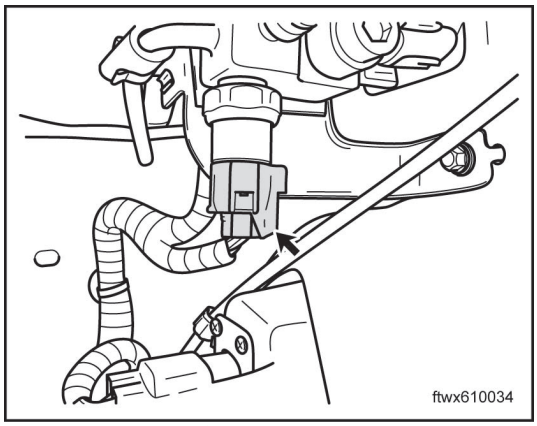
No > Maintenance or replace harness.

4 . Check the harness and connectors (air conditioner controller -air-condition pressure switch)

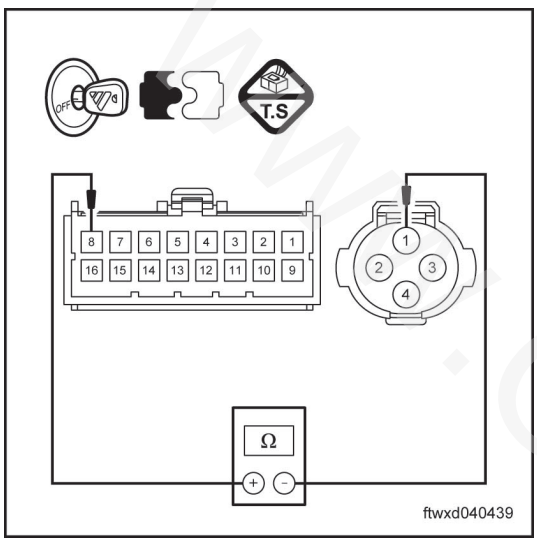
(a) Disconnect battery negative cable.



(b) Disconnect the connector C021 of air conditioner controller.



(c) Disconnect the connector A001 of air-condition pressure switch.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C021（A8）—A001（1）	＜2Ω

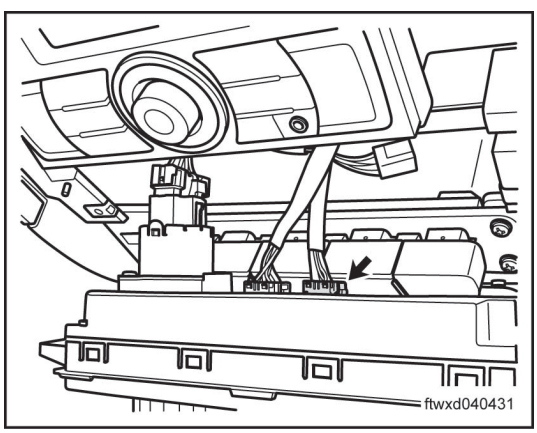
Check whether the result is normal?

Yes> go to step 5

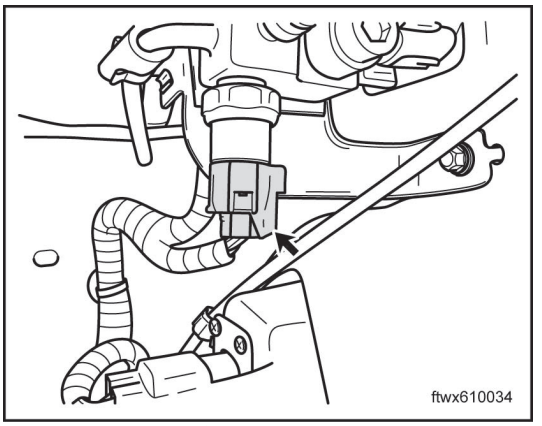
No > Maintenance or replace harness.

5 . Check the harness and connectors (air-condition pressure switch - ground)

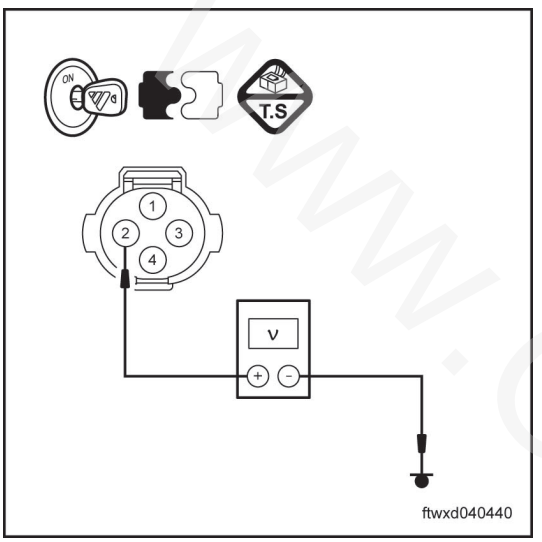
(a) Disconnect battery negative cable.



(b) Disconnect the connector C021 of air conditioner controller.



(c) Disconnect the connector A001 of air-condition pressure switch.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A001 (2) - ground	＜2Ω

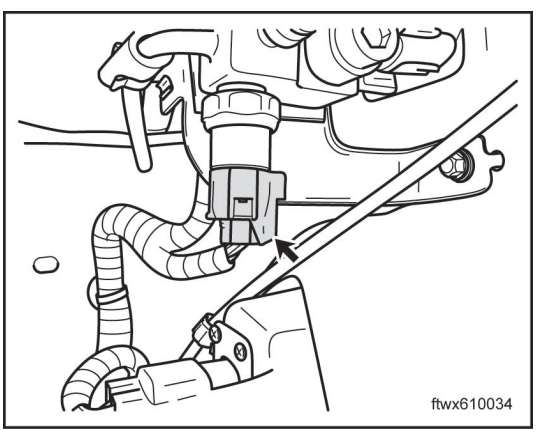
Check whether the result is normal?

Yes> go to step 6

No > Maintenance or replace harness.

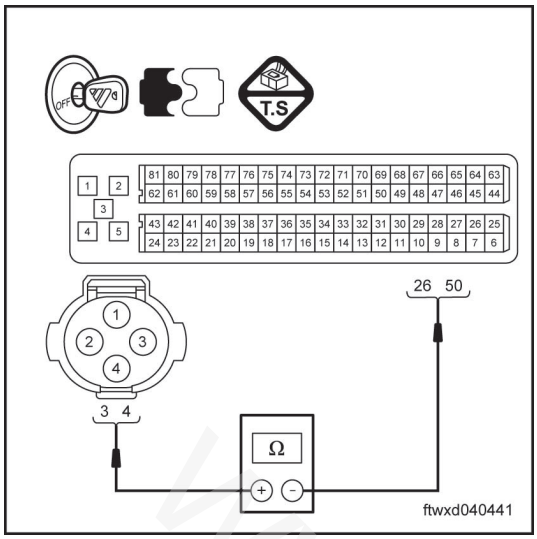
6 . Check the harness and connectors (air conditioner controller - engine control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector A001 of air-condition pressure switch.

(c) Unplug the electronic control unit E006 of engine.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A001（3）—E006（26）	＜2Ω
A001（4）—E006（50）	

04

Check whether the result is normal?

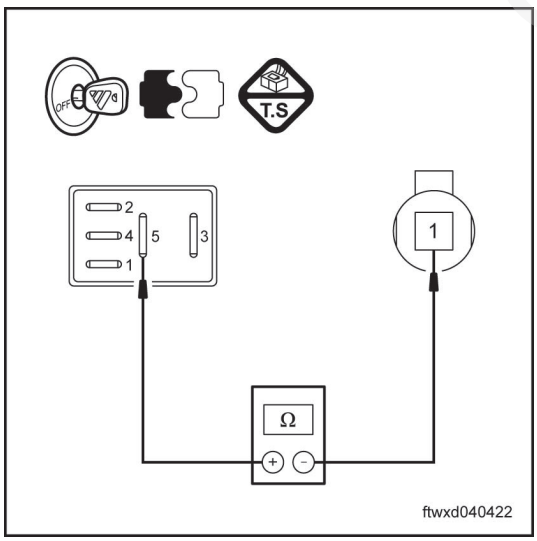
Yes > Replace the air-condition pressure switch, and verify again whether the failure exists.

No > Maintenance or replace harness.

7 . Check the harness and connectors (relay of air conditioner compressor - magnetic clutch)

(a) Unplug the relay R14 of air conditioner compressor

(b) Unplug the connector E017 of magnetic clutch.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R14（5）- E017	＜2Ω

Check whether the result is normal?

Yes > Replace the magnetic clutch, and verify again whether the failure exists.

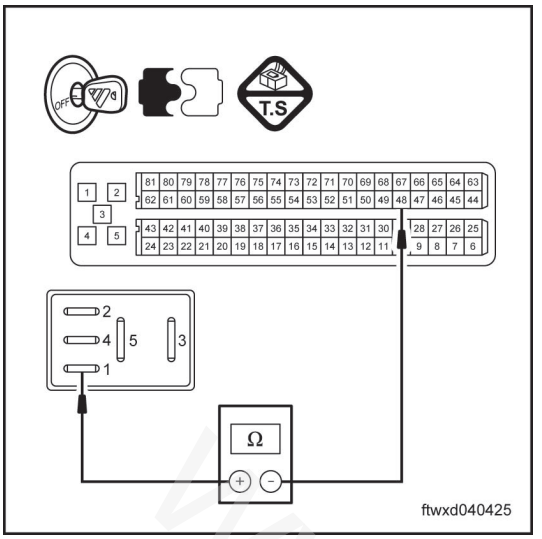
No > Maintenance or replace harness.

8 . Check the harness and connectors (replay of air conditioner compressor - engine control unit)

(a) Disconnect battery negative cable.

(b) Unplug the relay R14 of air conditioner compressor

(c) Unplug the electronic control unit E006 of engine.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R14（1）—E006（10）	＜2Ω

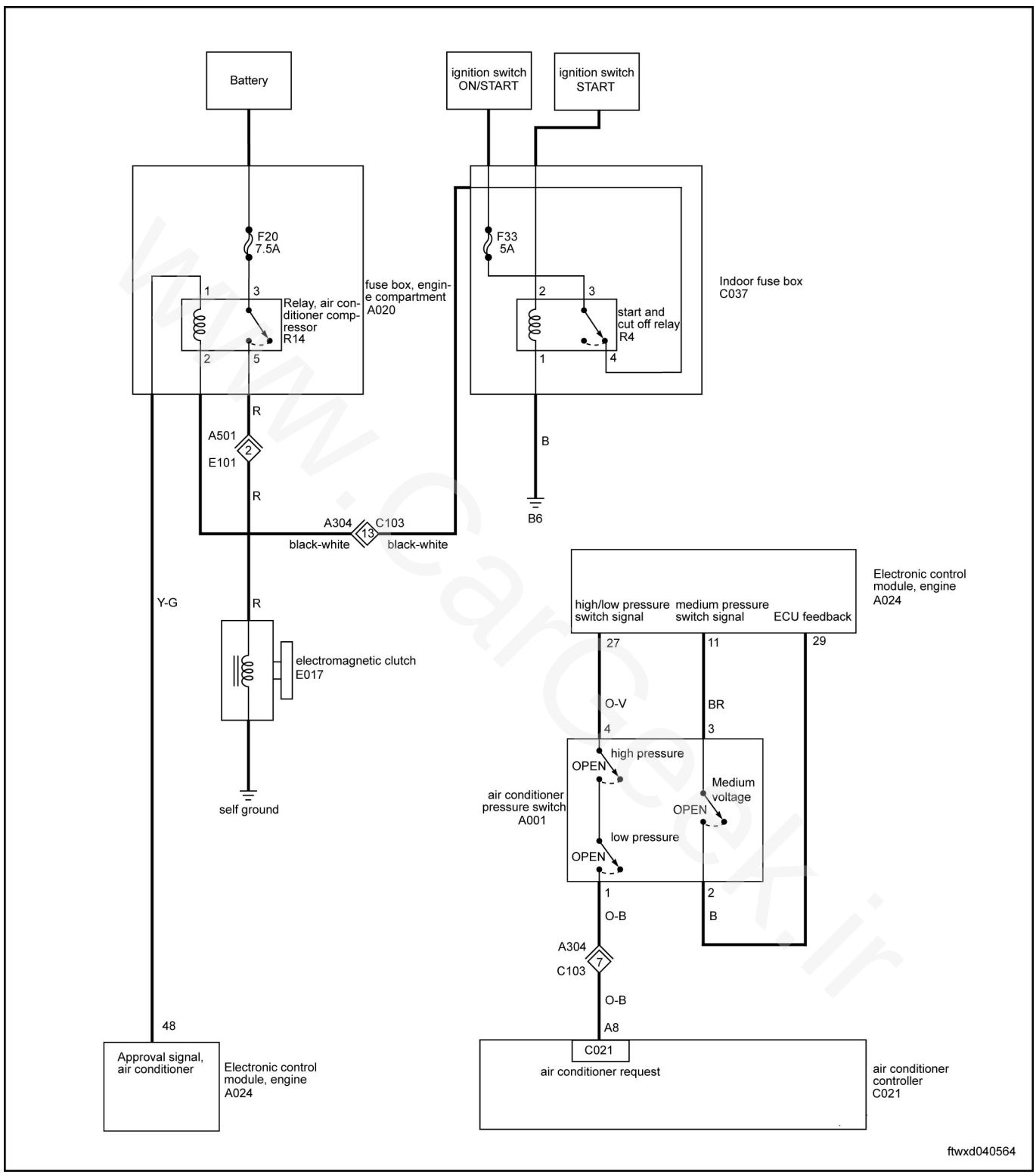
Check whether the result is normal?

Yes > Replace the engine control unit, and verify again whether the failure exists.

No > Maintenance or replace harness.

REFRIGERATING SYSTEM: FAILURE TO REFRIGERATE (DIESEL OIL)

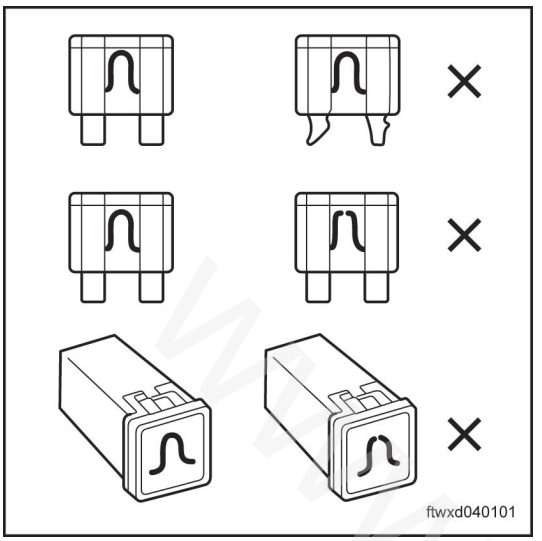
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check the fuse inside the fuse box of engine compartment:

- F20（7.5A）

(c) Check the fuse inside the vehicle-body fuse box:

- F33（5A）

Check whether the result is normal?

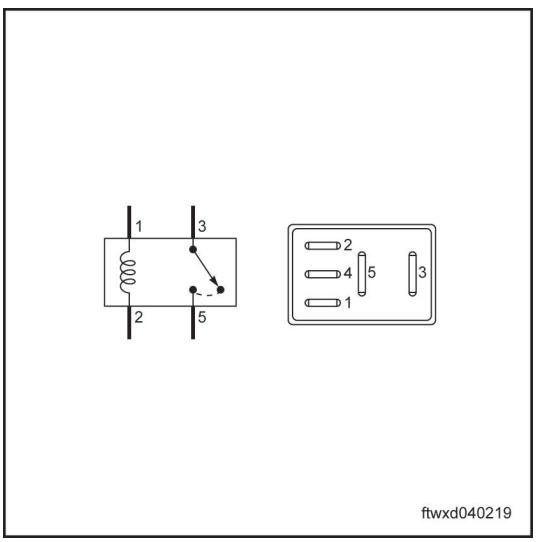
Yes> go to step 2

No> replace fuse

2 . Check the starter relay

(a) Disconnect battery negative cable.

(b) Unplug the relay R4 of starter.



(c) Check the relay, starter.

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1-2	Breakover
Apply power supply voltage to position between stitch 3 and 5,	3-5	＜2Ω

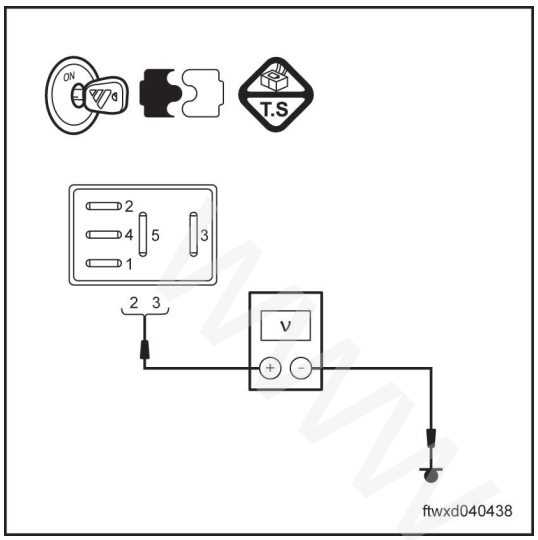
Check whether the result is normal?

Yes> go to step 3

No > Replace the starter relay, and verify again whether the failure exists.

3 . Check the harness and connectors (starter relay - ground)

(a) Disconnect battery negative cable.
(b) Unplug the relay R4 of starter.
(c) Connect battery negative cable.
(d) Start the engine.
(e) Turn on the A/C switch.



(f) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Standard value
R14 (2) - ground	Battery voltage
R14 (3) - ground	

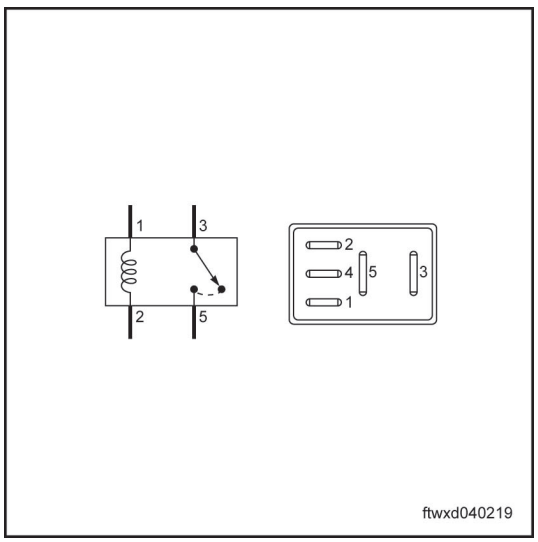
Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

4 . Check the relay of air conditioner compressor

(a) Disconnect battery negative cable.
(b) Unplug the relay R14 of air conditioner compressor



(c) Check the relay of air conditioner compressor

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Normal situation	1-2	Breakover
Apply power supply voltage to position between stitch 3 and 5,	3-5	＜2Ω

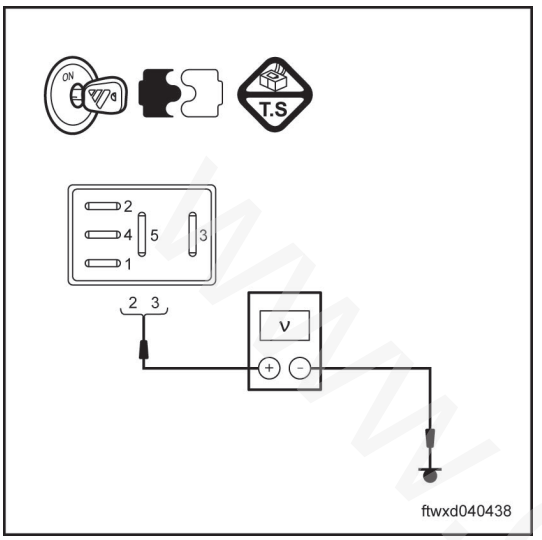
Check whether the result is normal?

Yes> go to step 5

No > Replace the relay of air conditioner compressor, and verify again whether the failure exists.

5 . Check the harness and connectors (relay of air conditioner compressor - ground)

(a) Disconnect battery negative cable.
(b) Unplug the relay R14 of air conditioner compressor
(c) Connect battery negative cable.
(d) Start the engine.
(e) Turn on the A/C switch.



(f) Measure the voltage based on the value in the following form.

Standard voltage

Multimeter connection	Standard value
R14 (2) - Ground	Battery voltage
R14 (3) - Ground	

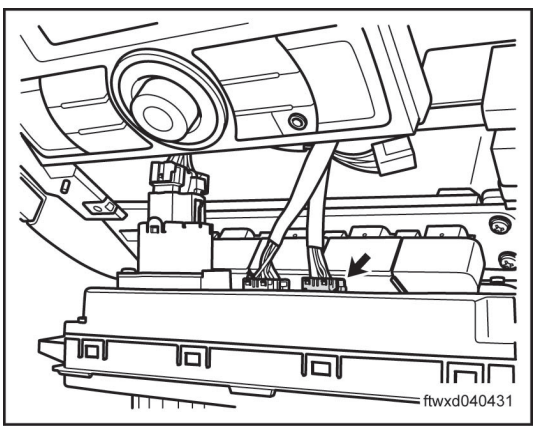
Check whether the result is normal?

Yes> go to step 6

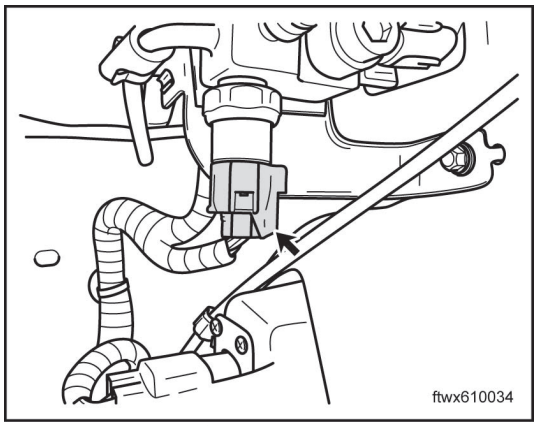
No > Maintenance or replace harness.

6 . Check the harness and connectors (air conditioner controller -air-condition pressure switch)

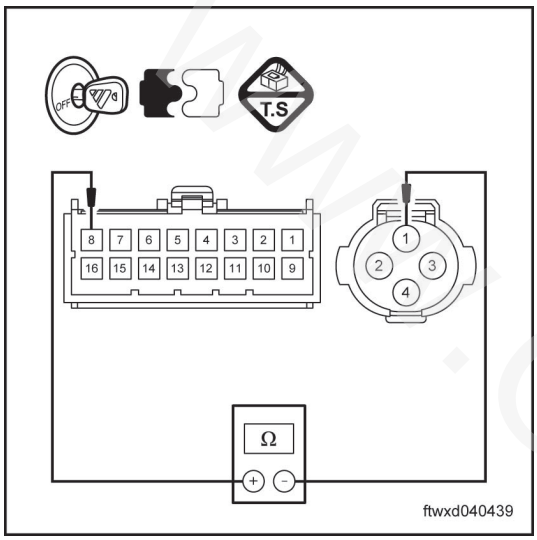
(a) Disconnect battery negative cable.



(b) Disconnect the connector C021 of air conditioner controller.



(c) Disconnect the connector A001 of air-condition pressure switch.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C021（A8）—A001（1）	＜2Ω

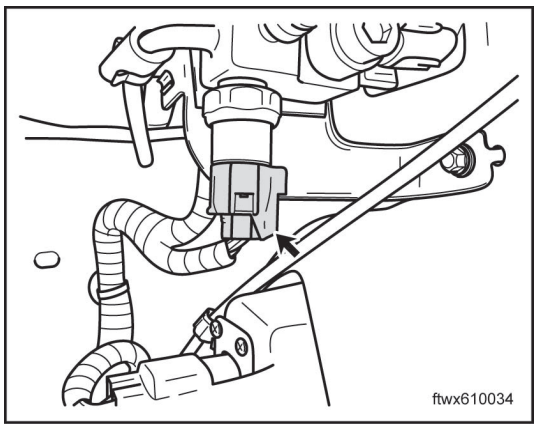
Check whether the result is normal?

Yes> go to step 7

No > Maintenance or replace harness.

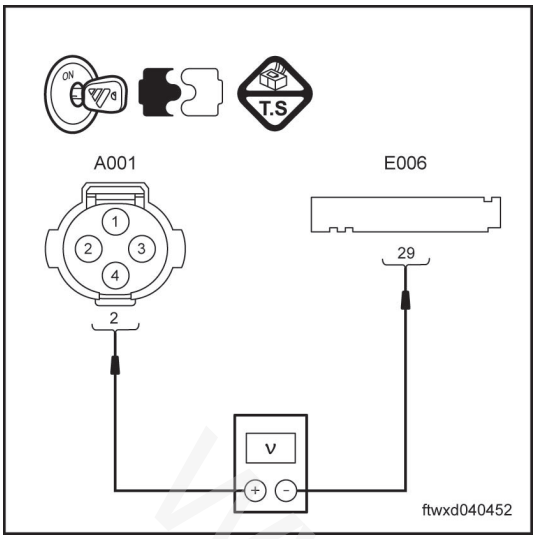
7 . Check the harness and connectors (air-conditioner pressure switch - engine control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector A001 of air-condition pressure switch.

(c) Unplug the control unit E006 of engine.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A001（2）—E006（29）	＜2Ω

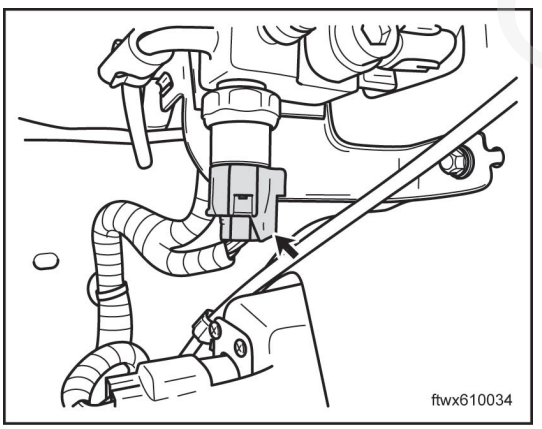
Check whether the result is normal?

Yes> go to step 8

No > Maintenance or replace harness.

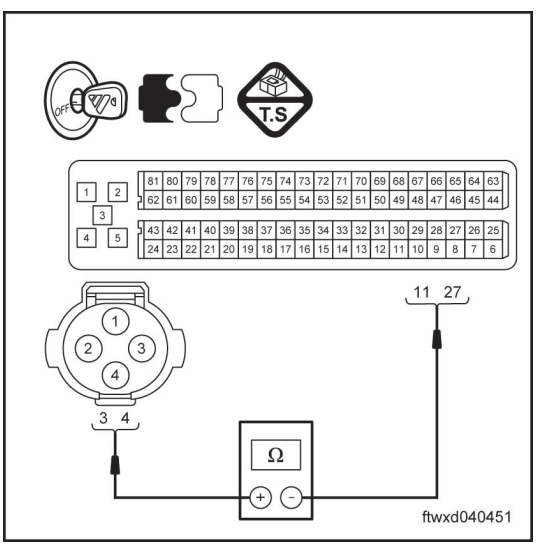
8 . Check the harness and connectors (air conditioner controller - engine control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector A001 of air-condition pressure switch.

(c) Unplug the electronic control unit E006 of engine.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A001（3）—E006（11）	＜2Ω
A001（4）—E006（27）	

Check whether the result is normal?

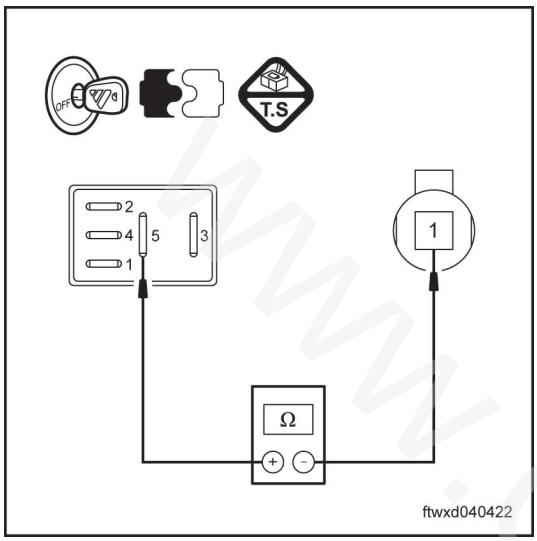
Yes > Replace the air-condition pressure switch, and verify again whether the failure exists.

No > Maintenance or replace harness.

9 . Check the harness and connectors (relay of air conditioner compressor - magnetic clutch)

(a) Unplug the relay R14 of air conditioner compressor

(b) Unplug the connector E017 of magnetic clutch.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R14（5）- E017	＜2Ω

Check whether the result is normal?

Yes > Replace the magnetic clutch, and verify again whether the failure exists.

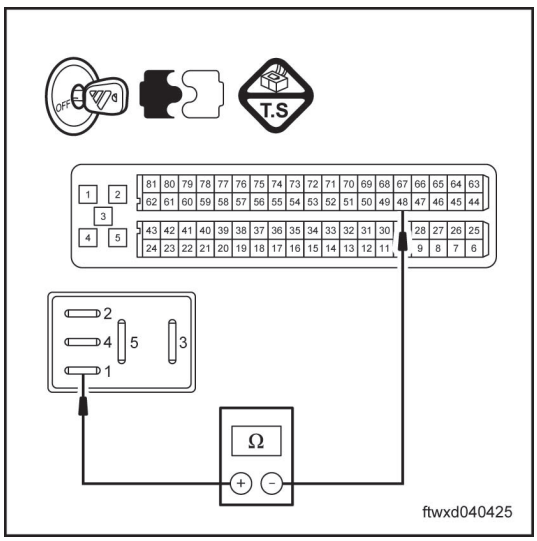
No > Maintenance or replace harness.

10 . Check the harness and connectors (replay of air conditioner compressor - engine control unit)

(a) Disconnect battery negative cable.

(b) Unplug the relay R14 of air conditioner compressor

(c) Unplug the electronic control unit E006 of engine.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R14（1）—E006（48）	＜2Ω

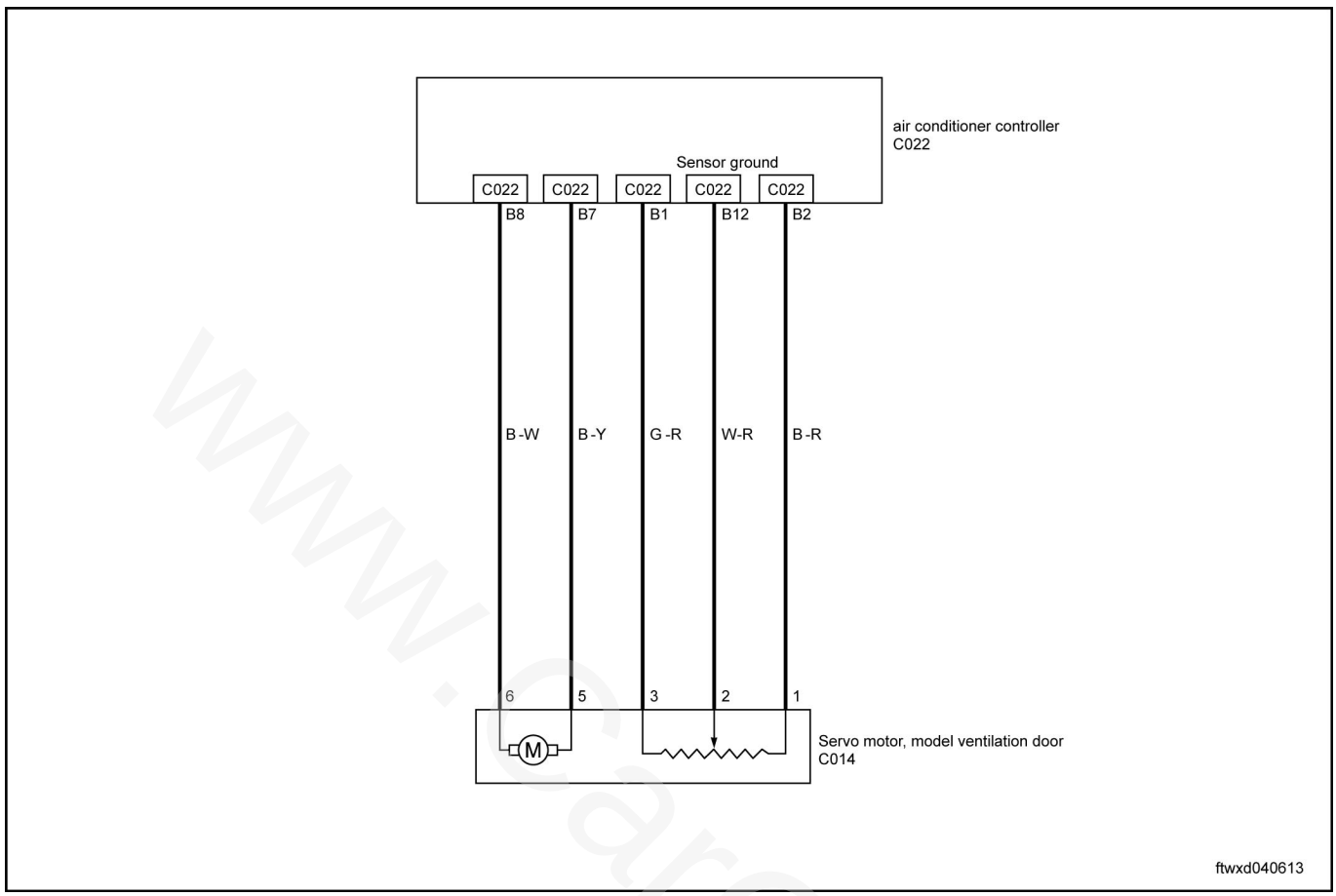
Check whether the result is normal?

Yes > Replace the engine control unit, and verify again whether the failure exists.

No > Maintenance or replace harness.

FAILURE OF SERVO MOTOR OF MODE AIR DOOR

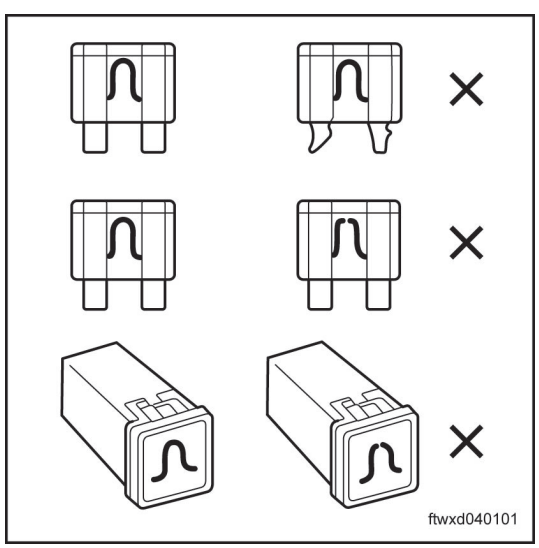
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check the fuse inside the vehicle-body fuse box:

- F7（7.5A）
- F9（5A）
- F33（5A）

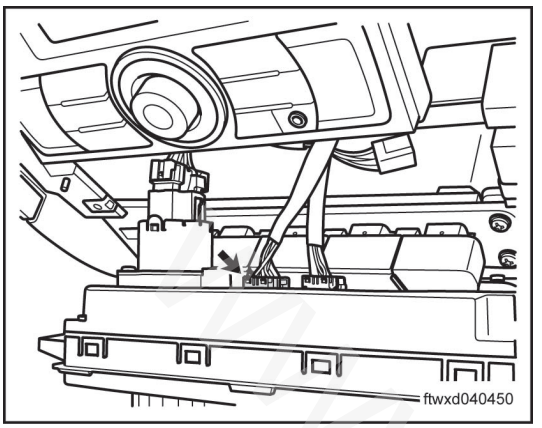
Check whether the result is normal?

Yes> go to step 2

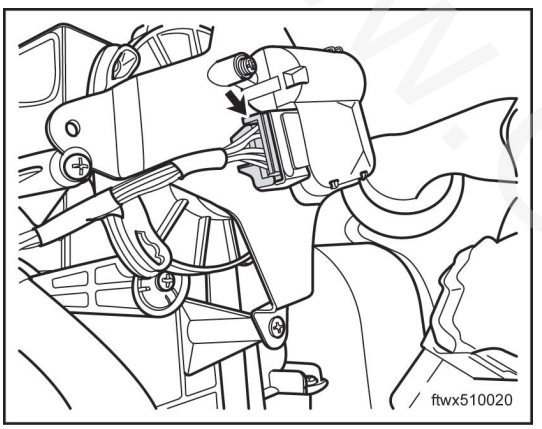
No> replace fuse

2 . Check the harness and connectors (air condition controller - mode air door servo motor)

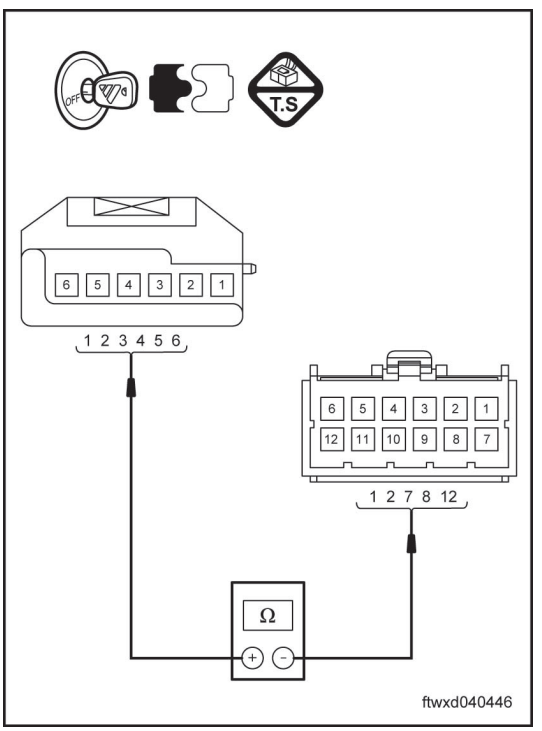
(a) Disconnect battery negative cable.



(b) Disconnect the controller connector C022 of air conditioner.



(c) Disconnect the connector C014 of mode air door servo motor.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

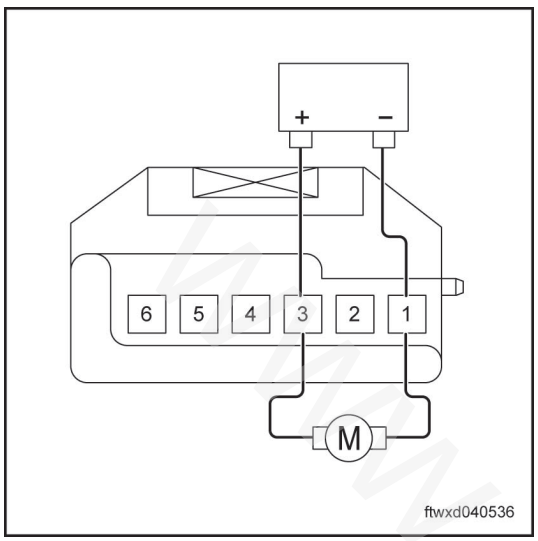
Multimeter connection	Standard value
C022（B2）—C014（1）	＜2Ω
C022（B12）—C014（2）	
C022（B1）—C014（3）	
C022（B7）—C014（5）	
C022（B8）—C014（6）	

Check whether the result is normal?

Yes> go to step 3

No > Maintenance or replace harness.

3 . Check the mode air door servo motor.



(a) Connect the battery positive terminal (+) to pin 3 of connector of mode air door servo motor.

(b) Connect the battery negative terminal (-) to pin 1 of connector of mode air door servo motor.

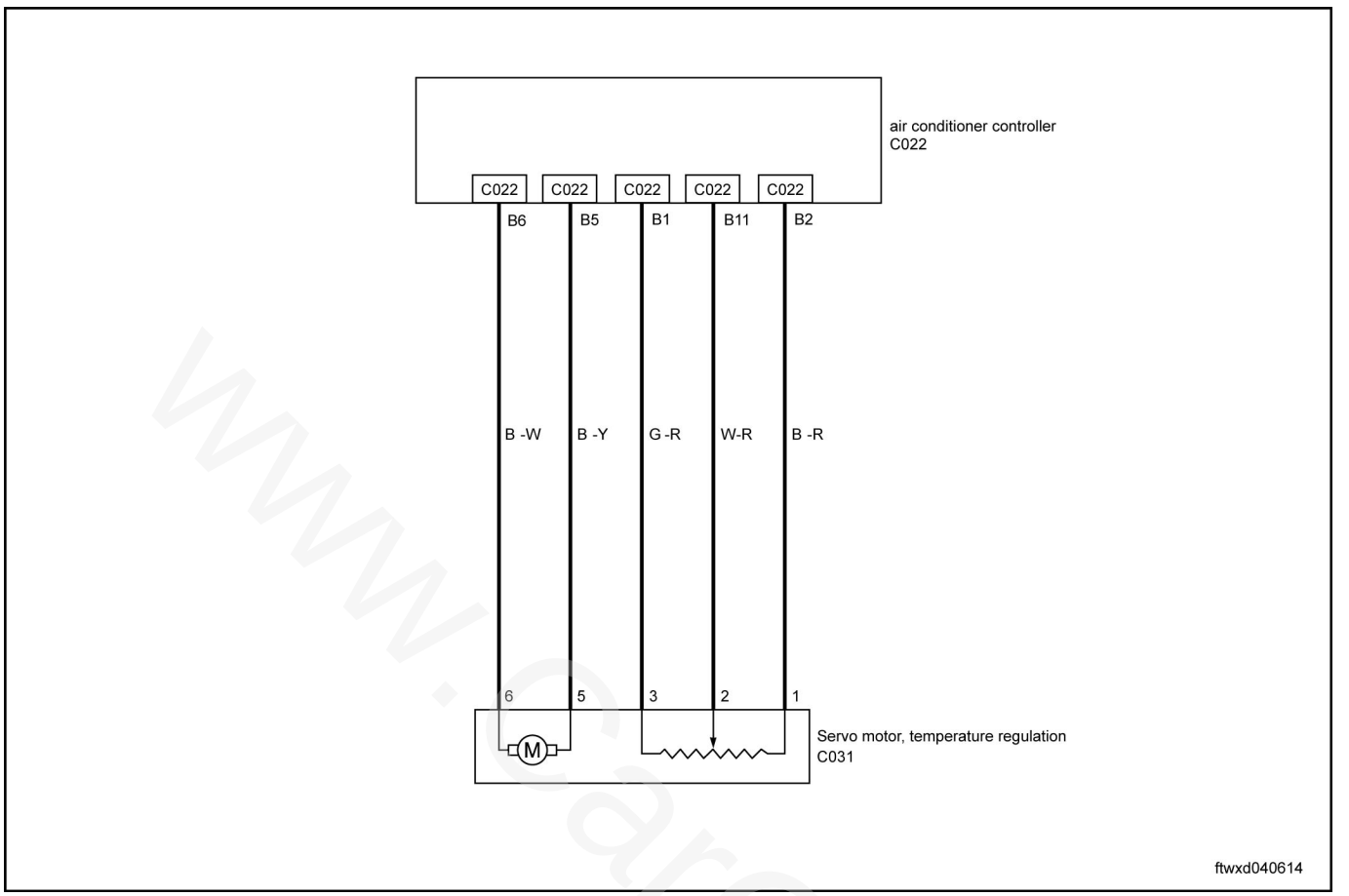
Check whether the result is normal?

Yes > Replace the air conditioner controller.

No > Replace the mode air door servo motor, and verify again whether the failure exists.

FAILURE OF TEMPERATURE REGULATION SERVO MOTOR

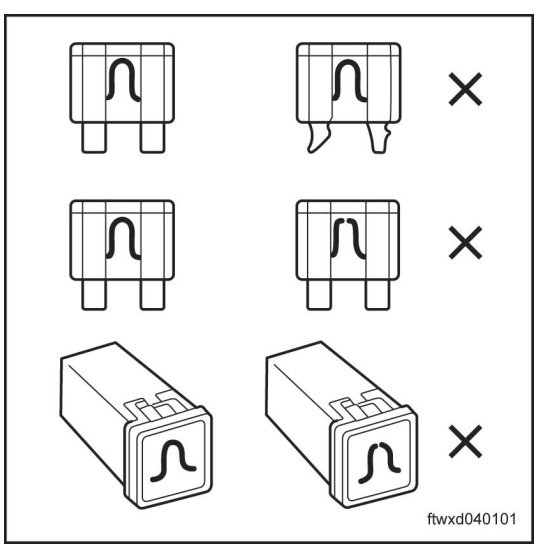
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Disconnect battery negative cable.



(b) Check the fuse inside the vehicle-body fuse box:

- F7（7.5A）
- F9（5A）
- F33（5A）

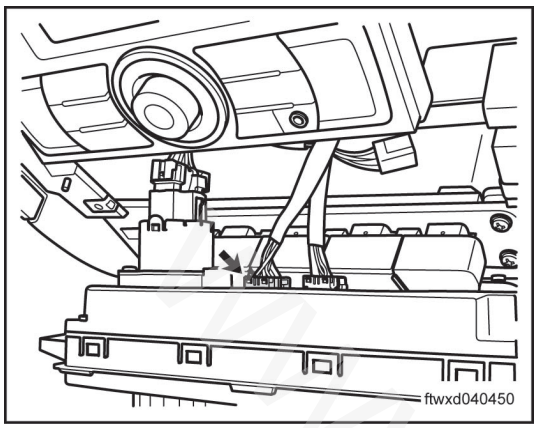
Check whether the result is normal?

Yes> go to step 2

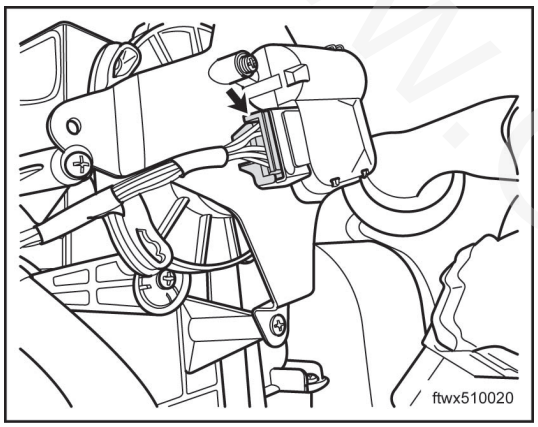
No> replace fuse

2 . Check the harness and connectors (air condition controller - temperature regulation servo motor)

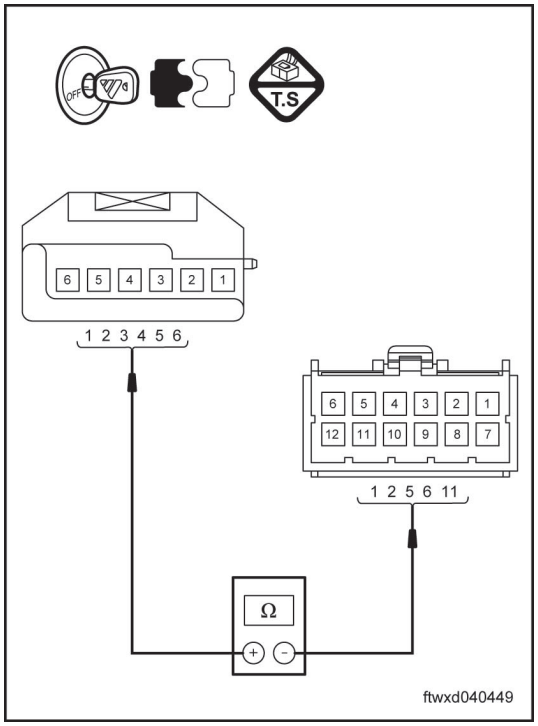
(a) Disconnect battery negative cable.



(b) Disconnect the controller connector C022 of air conditioner.



(c) Disconnect the temperature regulation servo motor C031.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

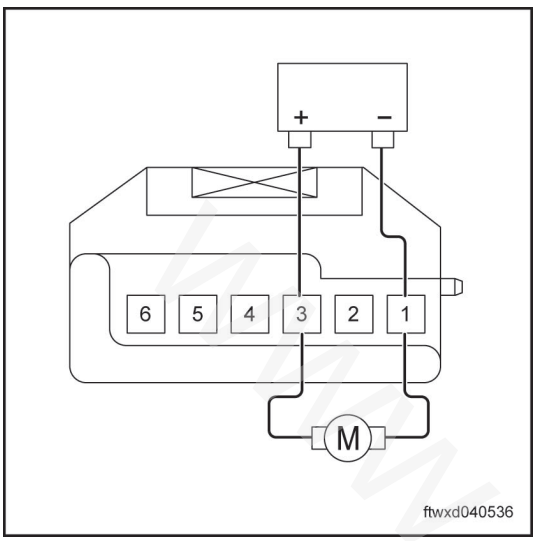
Multimeter connection	Standard value
C022（B2）—C031（1）	＜2Ω
C022（B11）—C031（2）	
C022（B1）—C031（3）	
C022（B5）—C031（5）	
C022（B6）—C031（6）	

Check whether the result is normal?

Yes> go to step 3

No > Maintenance or replace harness.

3 . Check the temperature regulation servo motor



(a) Connect the battery positive terminal (+) to pin 3 of connector of temperature regulation servo motor.

(b) Connect the battery negative terminal (-) to pin 1 of connector of temperature regulation servo motor.

Check whether the result is normal?

Yes > Replace the air conditioner controller.

No > Replace the temperature regulation servo motor, and verify again whether the failure exists.

AUDIO SYSTEM

PRECAUTION

1 . It is strictly forbidden to modify the audio system or add other audio apparatus into the system.

2 . The audio system uses the following radio bands.

Radiowave	**AM**		**FM**	
Modulation methods	**Amplitude modulation**		**Frequency modulation**	
Wave bands:	**AM1**	**AM2**	**FM1**	**FM2**
Frequency range	**522 ～ 1620 KHz**		**87.5 ～ 108 MHz**	

3 . Precautions for CD/DVD player

⚠ CAUTION

Do not look at laser head straight since the CD/DVD player uses invisible laser beams. Operate the player according to the instruction strictly

(a) The CD/DVD player uses its laser head to read the digital signals recorded on the CDs/DVDs. It playbacks music and other objects by converting digital signals into analog signals.

(b) The CD/DVD player uses 8cm and 12cm CD.

(c) CD player can only playback the CDs marked with the logo.

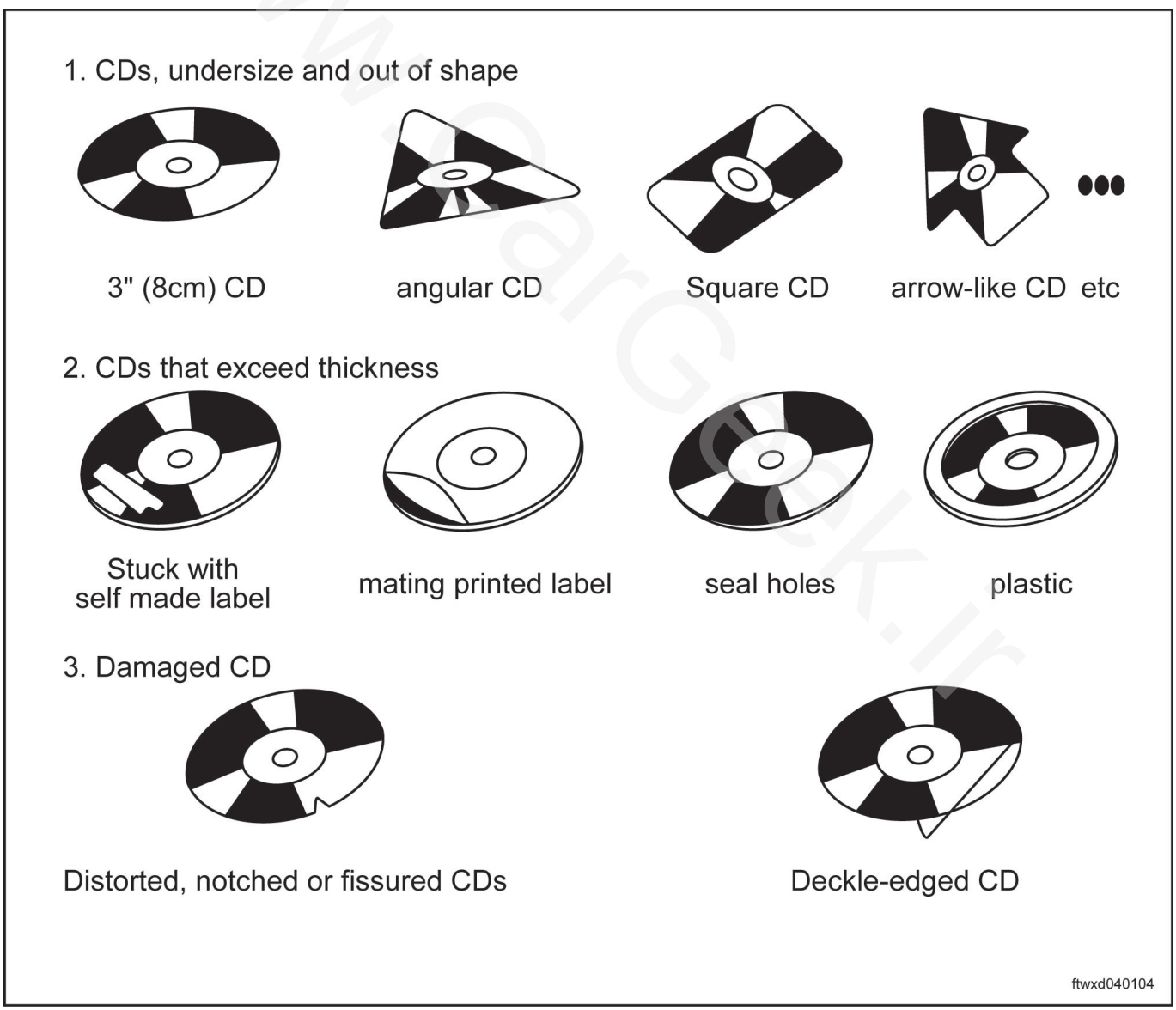
(d) DVD player can only playback the CDs marked with the following logos.

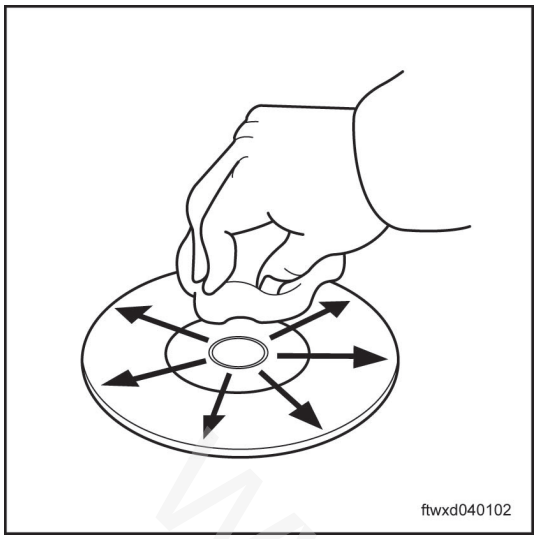
(e) Precautions for usage of CDs

- The CD/DVD player is designed as a single-disc player. Never put multiple CDs into the player; otherwise the player may be damaged.

- The CD/DVD player uses 12±0.03mm CDs.
- Some CDs/DVDs cannot be played back due to the special property or CDs or damages, filth or aging of CDs after long-term storage inside the vehicle.
- The CDs shall be protected from filth/contamination. Be careful not to damage the CDs or have finger marks left over on them.
- Hold the outer edge and center hole of a CD, with its labeled side facing upward.
- If a CD is kept outside the slot for a long period after the CD ejection button is pushed, the CD may be subjected to deformation and cannot be used again.
- If there is any traces of tapes, labels or any similar labels are left over on a CD, the CD cannot be ejected or may cause failure of the player.
- Keep the CDs from direct sunshine (CDs cannot be used if they are exposed to direct sunshine).)
- Do not use any CDs/DVDs of grotesque in shape or appearance; otherwise the CD/DVD player may fail to work.
- Do not use any CDs with transparent or partially transparent burnt sections because such CDs cannot be inserted, ejected or played back normally.

(f) The following CDs may not be used, and the acoustics unit may be damaged if they are used.





(g) Cleaning

- If the CDs surfaces get dirty, wipe them from interior to exterior in radial direction with dry soft cloth (such as wiping cloth for plastic lens and spectacles).

⚠ CAUTION

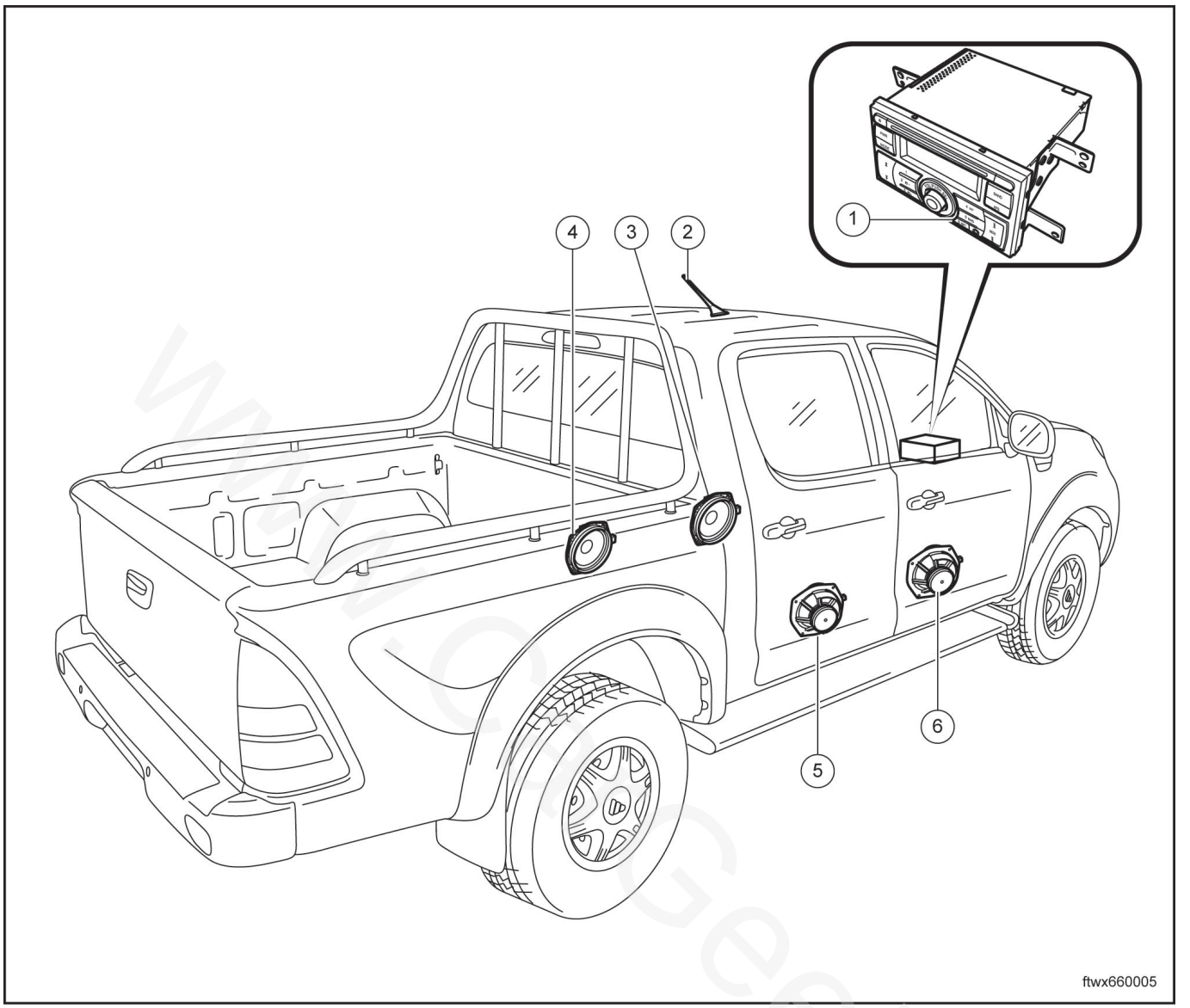
- **Do not use camera lens cleanser since it may cause the failure of laser head of the CD/DVD player.**
- **The CD surface may be damaged if wiping it with hands or coarse cloth.**
- **CDs may be damaged by substances such as CD atomizing agents, antistatic agents, alcohol, benzene and thinning agents or cloth dipped with chemicals, such that they may not be used again.**

4 . Switch off the power.

(a) When disconnecting or installing any electric equipments, or when the tools and equipments are easy to contact exposed electric terminal, the negative（-）cable of the battery must be disconnected firstly so as to prevent people or vehicles from being damaged.

(b) If there is special illustration, ignition switch must be closed.

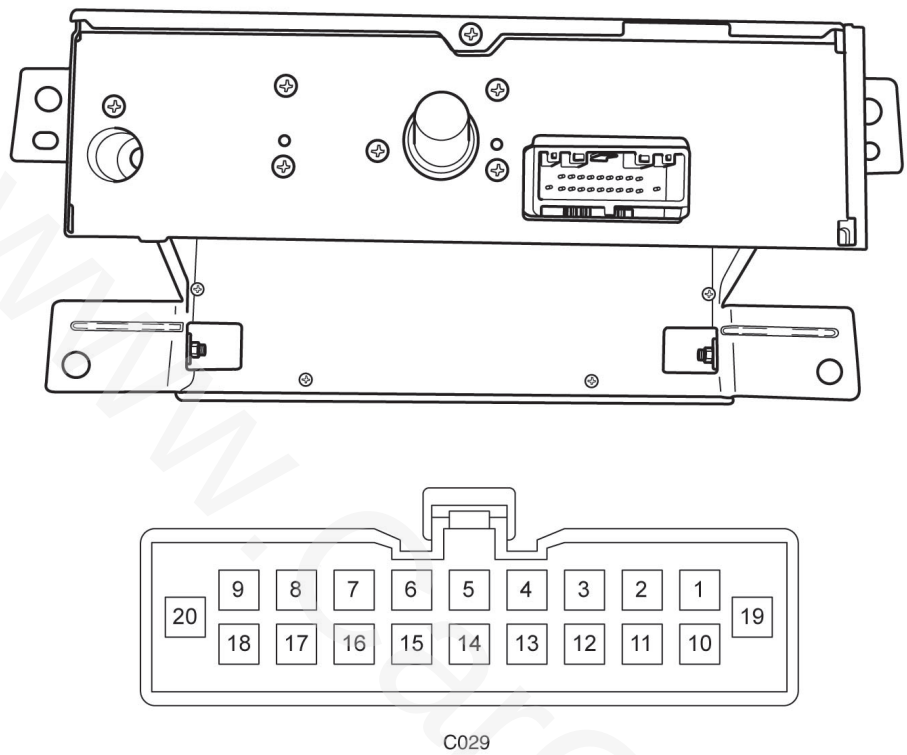
COMPONENTS DRAWING



1	CD player assembly
2	Antenna
3	Front speaker LH

4	Rear speaker LH
5	Front speaker RH
6	Rear speaker RH

TERMINAL, ACOUSTICS UNIT



ftwxd040117

Terminal no.		Connection rod color	Description
C029	1	-	-
	2	Purple - white	Speaker+, front left door
	3	Green-black	Speaker -, front left door
	4	Black - pink	Speaker +, rear left door
	5	Grey	Speaker -, rear left door
	6	Black	Ground, circuit control switch
	7	Red	ACC power
	8	-	-
	9	Blue	Backlight lighting +
	10	-	-

Terminal no.		Connection rod color	Description
	11	brown	Speaker+, front right door
	12	Light green	Speaker -, front right door
	13	Orange:	Speaker+, rear right door
	14	Pink	Speaker -, rear right door
	15	Red-white	Ground, circuit control switch
	16	-	-
	17	-	-
	18	-	-
	19	Black-Red	Constant power supply
	20	Black	ground

BASIC INSPECTION

Steps	Inspection contents		Measures
1	**Check Battery voltage** Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Replace the battery. Refer to "Chapter 20A, start and charge--battery"
2	**Check the antenna** • Check the antenna for foreign matter covering. • Check the antenna for bending or deformation. **Check whether the result is normal?**	Yes	No> go to step 3
		No?	Repair or replace the antenna
3	**Check the acoustics unit** • Push the acoustics power switch, and check the liquid crystal display for normal displaying. **Check whether the result is normal?**	Yes	No> go to step 4
		No?	Go to defect phenomenon form
4	**Check the acoustics unit** • Set the volume to over 10VOL, and check the speakers for sound. **Check whether the result is normal?**	Yes	No> go to step 5
		No?	Go to defect phenomenon form
5	**Check the radiowave** • There is a big difference in the coverage of AM and FM broadcast; sometimes AM broadcast may be received clearly while FM stereo broadcast cannot be received. The coverage of FM stereo broadcast is the minimum one and is susceptible to the interference of electromagnetic waves. • Phasing adjustment interference may be generated when a vehicle receives 2 radio-signals from 1 signal radiation tower, one of which is received directly from the signal radiation tower, and the other is reflected by the ionosphere. • Check whether or not there are high buildings or mountains around the vehicle; if any, they may obstruct part of the signals coming from the signal radiation tower to the vehicle. • Check whether or not there are any large-scale transformer substations and electric transmission stations around the vehicle. The strong electromagnetic wave emitted by them may lead to failure to receive the broadcast signals. • Due to the building materials, some buildings may reflect broadcast signals such that 2 signals may be received, and the desired signals are therefore interfered. **Check whether the result is normal?**	Yes	Go to defect phenomenon form
		No?	Move the vehicle to a place with better signals available

DEFECT PHENOMENON FORM

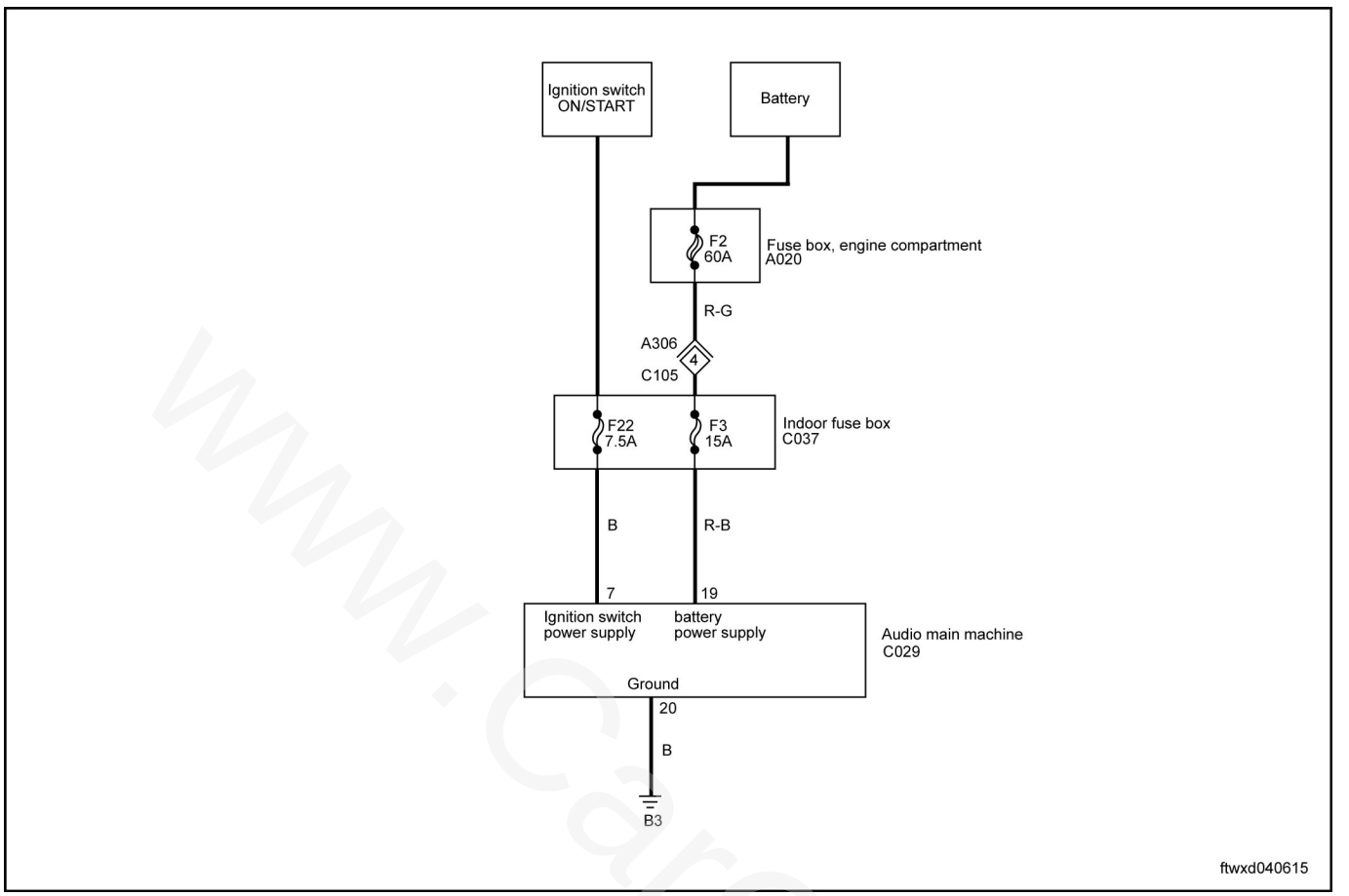
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Defect phenomenon	Possible Cause	Reference
Acoustics unit does not work	1. Power supply, ground circuit	Chapter 04 Audio system - acoustics unit does not work
	2. Acoustics unit itself	Chapter 04 Audio system - acoustics unit does not work
Speakers make no sound in any mode	1. In mute mode	Chapter 04 Audio system - Speakers make no sound in any mode
	2. Speaker circuit	Chapter 04 Audio system - Speakers make no sound in any mode
	3. Speakers	Chapter 04 Audio system - Speakers make no sound in any mode
	4. Acoustics unit itself	Chapter 04 Audio system - Speakers make no sound in any mode
Speakers make poor-quality sound in any mode	1. Acoustics unit is set up improperly	Chapter 04 Audio system - Speakers make poor-quality sound in any mode
	2. Speaker circuit	Chapter 04 Audio system - Speakers make poor-quality sound in any mode
	3. Speakers	Chapter 04 Audio system - Speakers make poor-quality sound in any mode
Speakers make weak sound in any mode	1. Acoustics unit is set up improperly	Chapter 04 Audio system - Speakers make weak sound in any mode
	2. Speaker circuit	Chapter 04 Audio system - Speakers make weak sound in any mode
	3. Speakers	Chapter 04 Audio system - Speakers make weak sound in any mode
	4. Acoustics unit itself	Chapter 04 Audio system - Speakers make weak sound in any mode
Speakers make poor-quality sound only when playing back CD/DVD	1. Acoustic fidelity of the media source file is poor	Chapter 04 Audio system - Speakers make poor-quality sound only when playing back CD/DVD
	2. Acoustics unit itself	Chapter 04 Audio system - Speakers make poor-quality sound only when playing back CD/DVD
No radio stations can be received or the receiving effect is poor	1. The interference of peripheral electromagnetic waves is too strong	Chapter 04 Audio system - No radio stations can be received or the receiving effect is poor
	2. Antenna	Chapter 04 Audio system - No radio stations can be received or the receiving effect is poor
	3. Acoustics unit itself	Chapter 04 Audio system - No radio stations can be received or the receiving effect is poor

Defect phenomenon	Possible Cause	Reference
CD/DVD cannot be inserted/played back, or CD/DVD is ejected immediately once it is inserted	1. CD cannot be recognized	Chapter 04 Audio system - CD/DVD cannot be inserted/played back, or CD/DVD is ejected immediately once it is inserted
	2. Acoustics unit itself	Chapter 04 Audio system - CD/DVD cannot be inserted/played back, or CD/DVD is ejected immediately once it is inserted
CD/DVD cannot be ejected	1. Unknown CD is used	Chapter 66 Audio system - CD/DVD player assembly, replacement
	2. Acoustics unit itself	Chapter 66 Audio system - CD/DVD player assembly, replacement
CD/DVD tune skipping	1. Acoustic fidelity of the CD source file is poor	Chapter 04 Audio system - CD/DVD tune skipping
	2. Acoustics unit itself	Chapter 04 Audio system - CD/DVD tune skipping
The display of CD/DVD player cannot display anything, while the acoustics system works normally	1. CDs	Chapter 66 Audio system - CD/DVD player assembly, replacement
	2. Acoustics unit itself	Chapter 66 Audio system - CD/DVD player assembly, replacement
The display of CD/DVD player is capable of normal displaying, while the speakers make no sound (in CD/DVD playback mode only)	1. CDs	Chapter 66 Audio system - CD/DVD player assembly, replacement
	2. Acoustics unit is set up improperly	Chapter 66 Audio system - CD/DVD player assembly, replacement
	3. Acoustics unit itself	Chapter 66 Audio system - CD/DVD player assembly, replacement

ACOUSTICS UNIT DOES NOT WORK

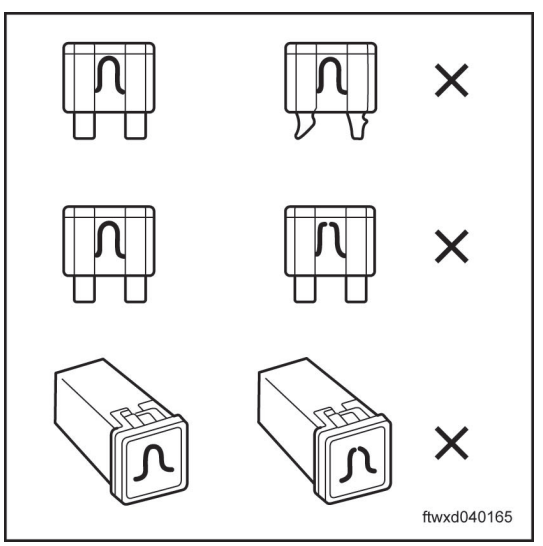
Circuit diagram



Diagnostic steps

1 . Check the fuse of power supply to the audio system

(a) Ignition Switch: OFF.



(b) Check the fuse inside the vehicle-body fuse box:

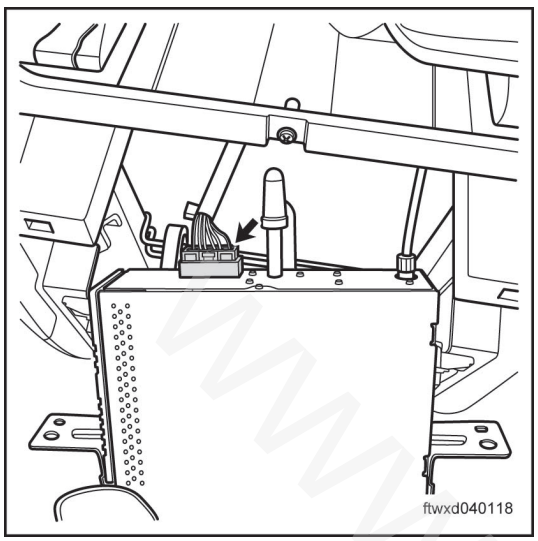
- F22(7.5)
- F3(15A)

Check whether the fuse is good or not?

Yes> go to step 4

No > If fuse only: F22 (7.5A) is blown out, go to step 2. If fuse only: F3 (15A) is blown out, go to step 3.

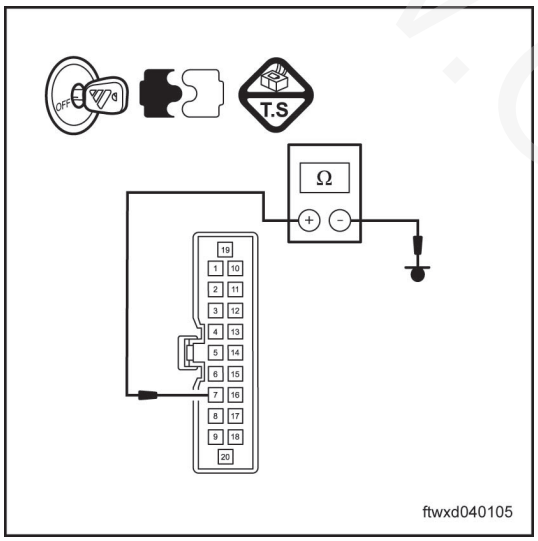
2 . Check the fuse of acoustics unit



(a) Disconnect the connectors of acoustics unit.

⚠ CAUTION

Be careful not to drop the acoustics unit.



(b) Use a multimeter to measure the resistance between pin 7 of connector C029 of acoustics unit and the ground.

Standard resistance (check whether there is short circuit)

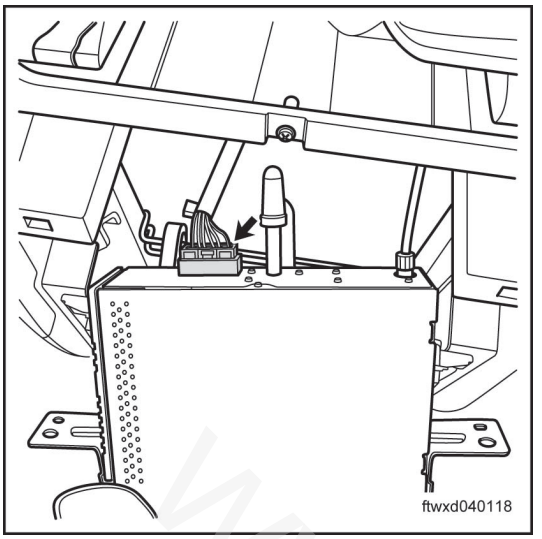
Multimeter connection	Standard value
C029(7) - ground	⩾ 1 MΩ

Check whether the result is normal?

Yes > Replace the CD/DVD acoustics unit

No > Replace fuse: F22 (7.5A), and repair the to-earth short-circuit of circuit from fuse F22 (7.5A) to pin 7 of connector C029 of acoustics unit.

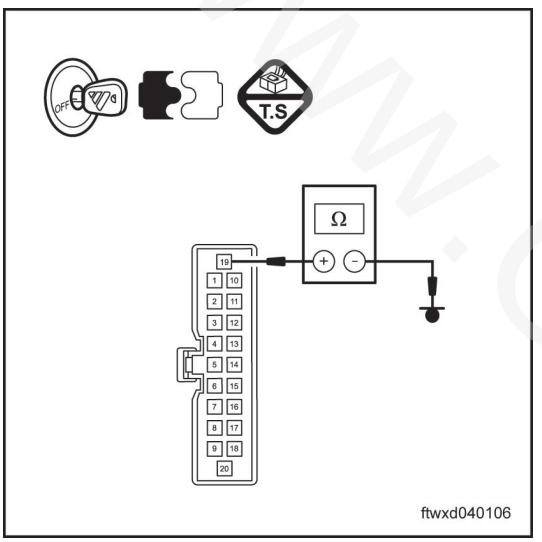
3 . Check the fuse of acoustics unit



(a) Disconnect the connectors of acoustics unit.

⚠ CAUTION

Be careful not to drop the acoustics unit.



(b) Use a multimeter to measure the resistance between pin 19 of connector C029 of acoustics unit and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C029(19) - ground	⩾ 1 MΩ

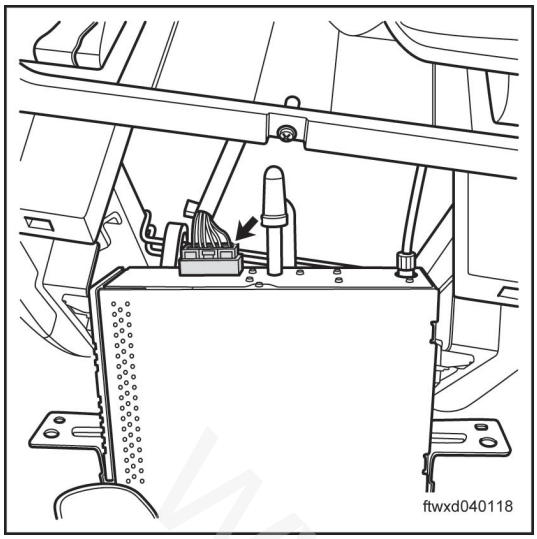
Check whether the result is normal?

Yes > Replace the CD/DVD acoustics unit

No > Replace fuse: F3 (15A), and repair the to-earth short-circuit of circuit from fuse F3 (15A) to pin 19 of connector C029 of acoustics unit.

4 . Check the power supply and ground circuit of the audio system

(a) Ignition Switch: OFF.

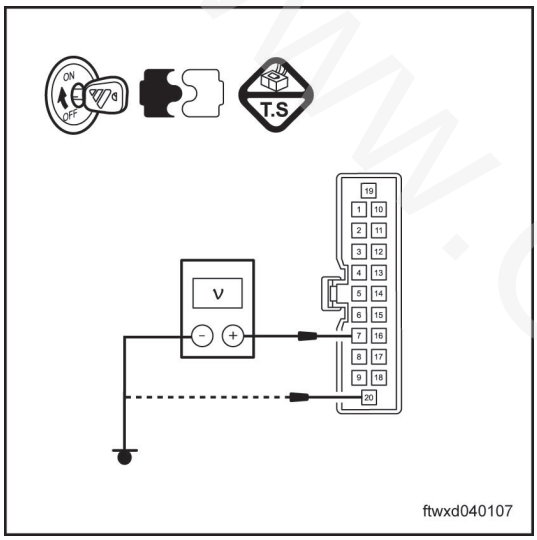


(b) Disconnect the connectors of acoustics unit.

⚠ CAUTION

Be careful not to drop the acoustics unit.

(c) Ignition Switch: ON.



(d) Use a multimeter to measure the voltage between pin 7 and pin 20, and the voltage between pin 7 of connector C029 of acoustics unit and the ground.

Standard voltage

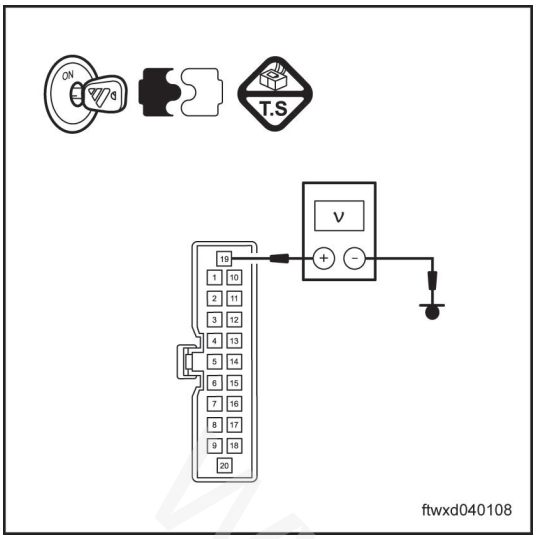
Multimeter connection	Standard value
C029(7) - C029(20)	Battery voltage
C029(7) - ground	Battery voltage

Check whether the result is normal?

Yes> go to step 5

No > If battery voltage is unavailable in both cases, repair the open circuit between F22 (7.5A) to pin 7 of connector C029 of acoustics unit. If battery voltage is not available only between pin 7 and pin 20 of connector C029 of acoustics unit, repair the open circuit between pin 20 of connector C029 of acoustics unit and the ground.

5 . Check the power circuit of audio system



(a) Use a multimeter to measure the voltage between pin 19 of connector C029 of acoustics unit and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C029(19) - ground	Battery voltage

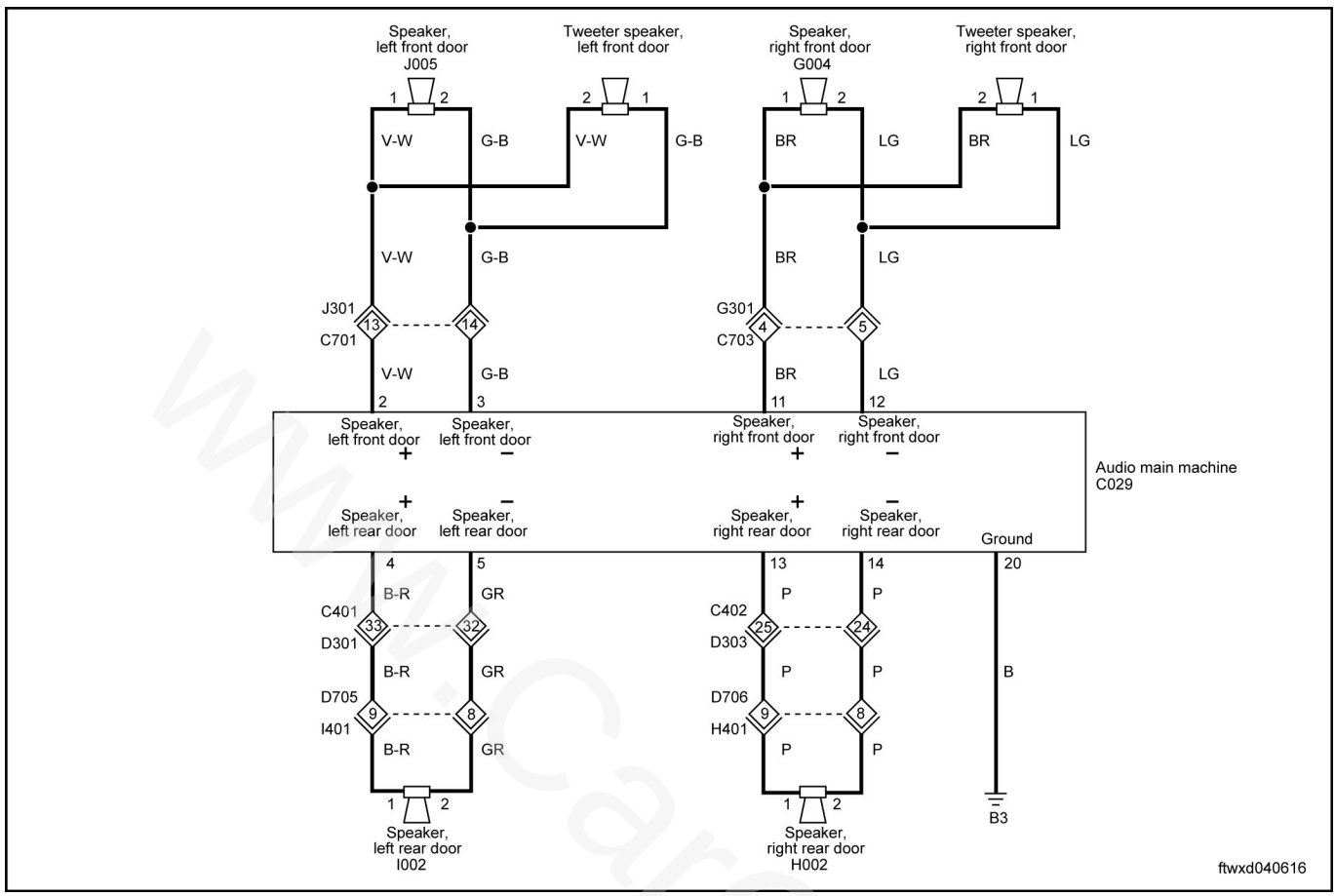
Check whether the result is normal?

Yes > Replace the CD/DVD acoustics unit

No > Repair the open circuit between pin 19 of connector C029 of acoustics unit and the fuse F3 (15A).

SPEAKERS MAKE NO SOUND IN ANY MODE

Circuit diagram



Diagnostic steps

1 . Check the setup of the acoustics unit

(a) Ignition switch: ON

(b) Push the power switch (PWR key) of acoustics unit.

(c) In start-up mode, push PWR key to access the mute function.

(d) Set the volume of acoustics unit to over 10VOL.

Check the speakers for sound making?

Yes > Acoustics unit is set up improperly.

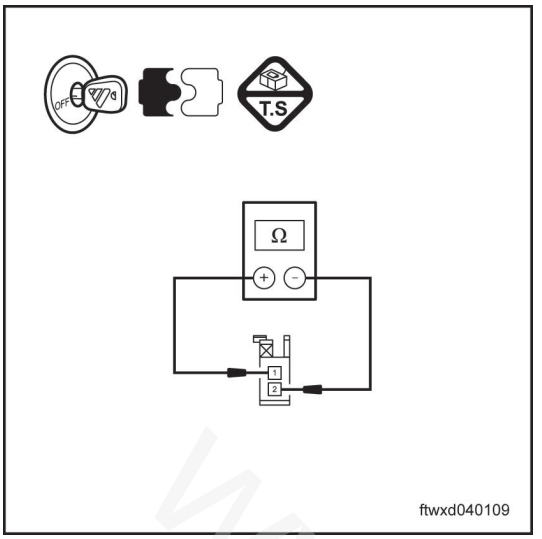
No> go to step 1

2 . Check the speakers

(a) Ignition Switch: OFF.

(b) Dismount all speakers see “Chapter 66 Audio system - speaker assembly,replacement”)

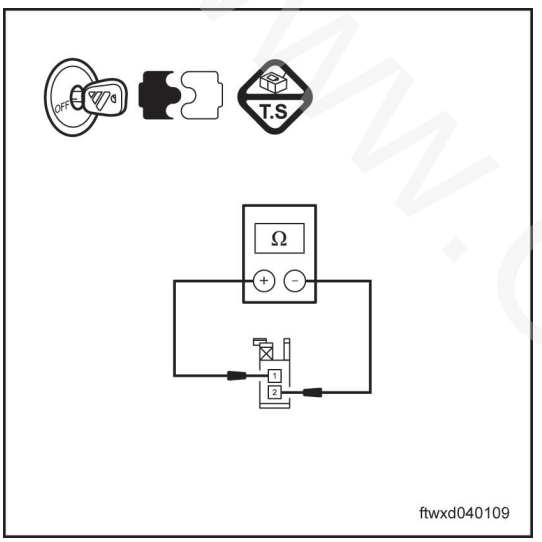
(c) Check the speakers for damaged cones.



(d) Use a multimeter to measure the resistance between pin 1 and pin 2 of the front speaker.

Standard voltage

Multimeter connection	Standard value
Standard value	4 Ω



(e) Use a multimeter to measure the resistance between pin 1 and pin 2 of the rear speaker.

Standard voltage

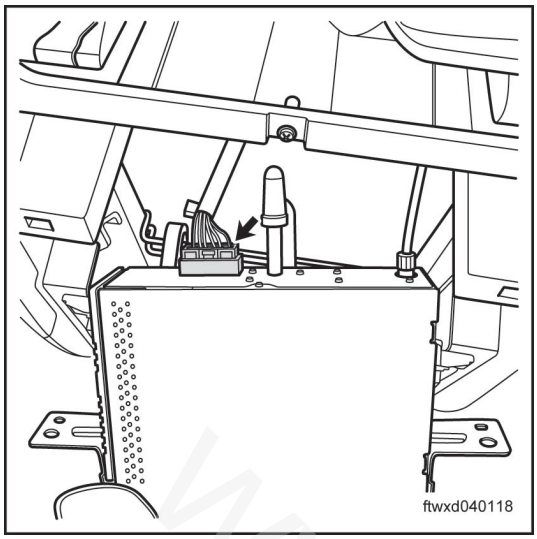
Multimeter connection	Standard value
1-2	4 Ω

Check whether the result is normal?

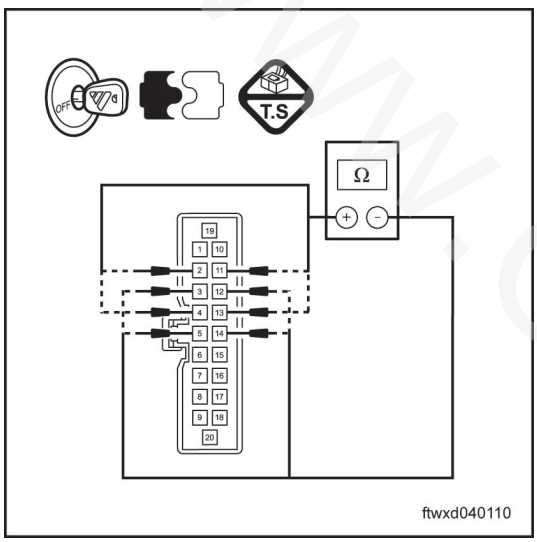
Yes> go to step 2

No > Replace the speakers.

3 . Check the signal circuits of speakers



(a) Disconnect the connectors of acoustics unit.



(b) Use a multimeter to measure the resistance between the pins of connector C029 of acoustics unit respectively.

Standard voltage

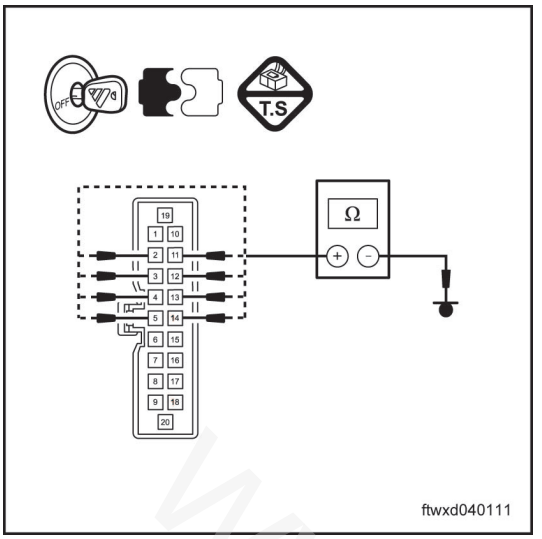
Multimeter connection	Standard value
C029(2) - C029(3)	⩾ 1 MΩ
C029(4) - C029(5)	⩾ 1 MΩ
C029(11) - C029(12)	⩾ 1 MΩ
C029(13) - C029(14)	⩾ 1 MΩ

Check whether the result is normal?

Yes> go to step 3

No > Repair the short circuit between connector C029 of acoustics unit and the speakers.

4 . Check the signal circuits of speakers for short circuit



(a) Use a multimeter to measure the resistance between pin 2 and pins 5, 11 and 14 of connector C029 of acoustics unit and the ground.

Standard resistance (check whether there is short circuit)

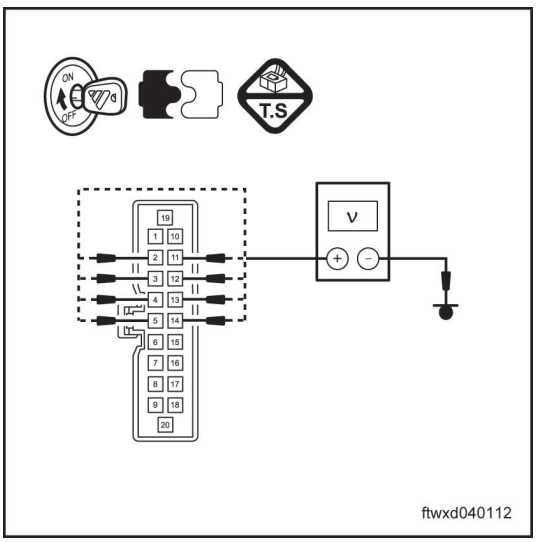
Multimeter connection	Standard value
C029(2) - ground	⩾ 1 MΩ
C029(3) - ground	⩾ 1 MΩ
C029(4) - ground	⩾ 1 MΩ
C029(5) - ground	⩾ 1 MΩ
C029(11) - ground	⩾ 1 MΩ
C029(12) - ground	⩾ 1 MΩ
C029(13) - ground	⩾ 1 MΩ
C029(14) - ground	⩾ 1 MΩ

Check whether the result is normal?

Yes> go to step 4

No >Repair the to-ground short circuit of signal circuits of speakers.

5 . Check the signal circuits of speakers for short circuit



(a) Ignition Switch: ON.

(b) (b) Use a multimeter to measure the voltage between pin 2 and pins 5, 11 and 14 of connector C029 of acoustics unit and the ground.

Standard voltage

Multimeter connection	Standard value
C029(2) - ground	0 V
C029(3) - ground	0 V
C029(4) - ground	0 V
C029(5) - ground	0 V
C029(11) - ground	0 V
C029(12) - ground	0 V
C029(13) - ground	0 V
C029(14) - ground	0 V

Check whether the result is normal?

Yes > Replace the CD/DVD acoustics unit

No >Repair the to-power-supply short circuit of signal circuits of speakers.

SPEAKERS MAKE POOR-QUALITY SOUND IN ANY MODE

Diagnostic steps

1 . Check the setup of the acoustics unit

(a) Ignition Switch: ON.
(b) Push the power switch of acoustics unit.
(c) Set the volume of acoustics unit to over 10VOL.
(d) Set the “FAD” and “BAL” to their initial settings.
(e) Push and hold “VOL” for at least 2 seconds to turn on the loudness function.

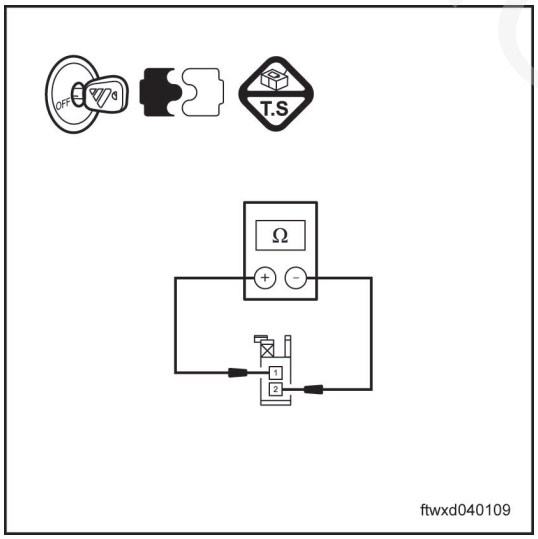
Check the speakers for normal tone quality?

Yes > CD/DVD acoustics unit is set up improperly.

No> go to step 2

2 . Check the speakers

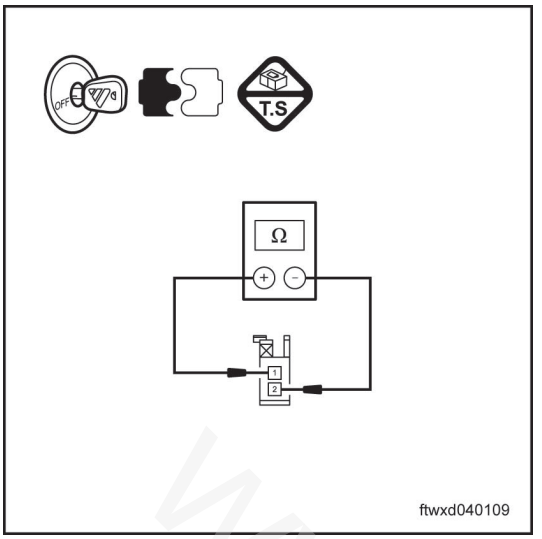
(a) Ignition Switch: OFF.
(b) Dismount the speakers. see “Chapter 66 Audio system - speaker assembly,replacement”)
(c) Check the speakers for attached foreign matters.
(d) Check the cones of speakers for excessive accumulated dust.
(e) Check the speakers for damaged cones.



(f) Use a multimeter to measure the resistance between pin 1 and pin 2 of the front speaker.

Standard voltage

Multimeter connection	Standard value
1-2	4 Ω



(g) Use a multimeter to measure the resistance between pin 1 and pin 2 of the rear speaker.

Standard voltage

Multimeter connection	Standard value
1-2	4 Ω

Check the speakers for normal tone quality?

Yes> go to step 3

No > Remove the foreign matters and dust, or replace the speakers.

3 . Make comparison with similar vehicle models

(a) Set the acoustics unit “FAD” and “BAL” to one level.

(b) Make comparison with similar vehicle models

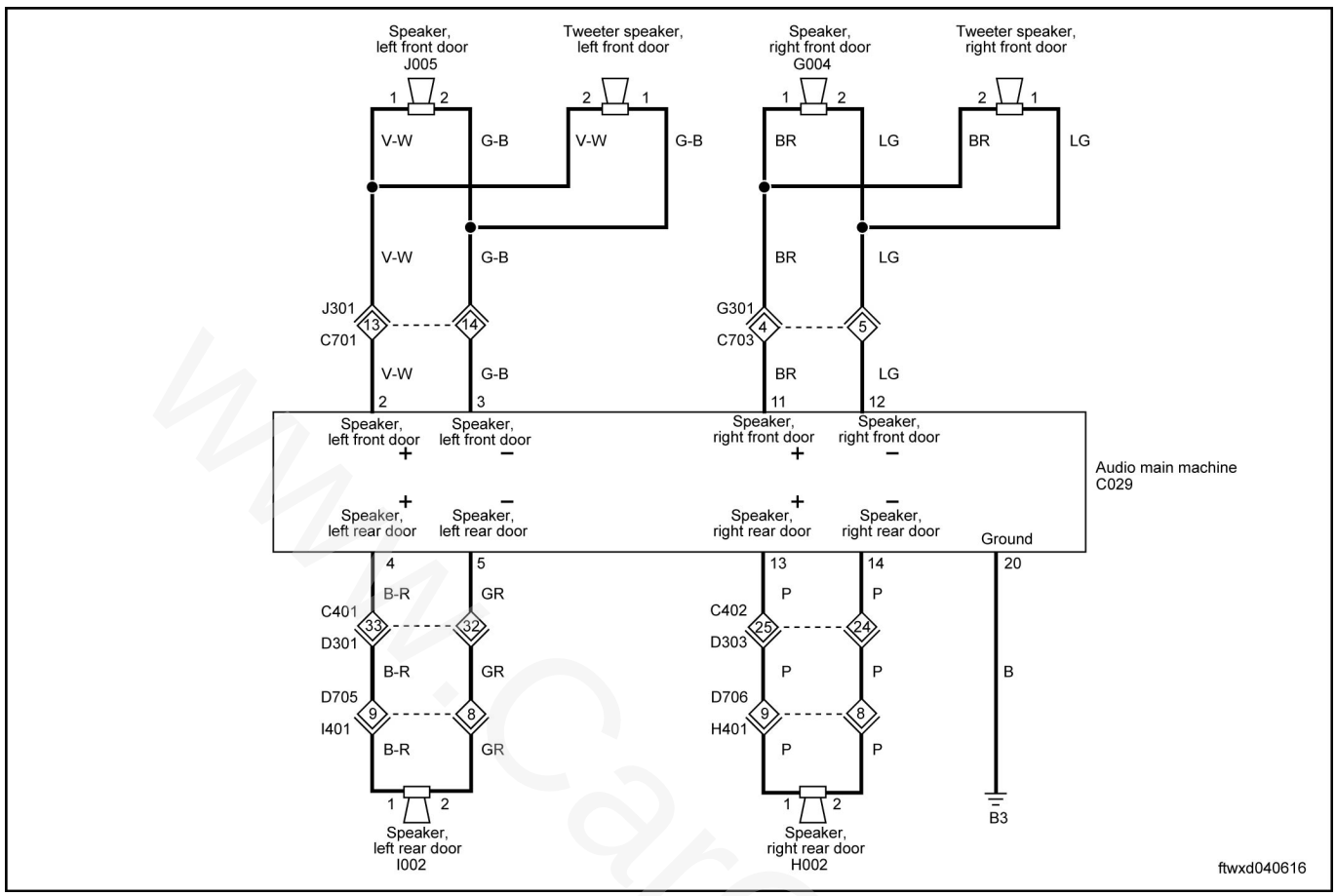
Check whether or not the tone quality of speakers is identical?

Yes > complete

No > Replace the CD/DVD acoustics unit

SPEAKERS MAKE WEAK SOUND IN ANY MODE

Circuit diagram



Diagnostic steps

1 . Check the setup of the acoustics unit

(a) Ignition Switch: ON.
(b) Push the power switch of acoustics unit.
(c) Set the volume of acoustics unit to over 10VOL.
(d) Set “BAL” to 0.

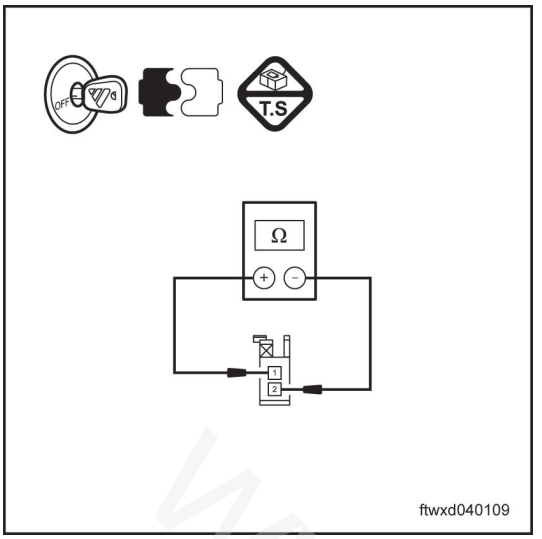
Check the speakers for normal volume?

Yes > CD/DVD acoustics unit is set up improperly.

No> go to step 2

2 . Check the speakers

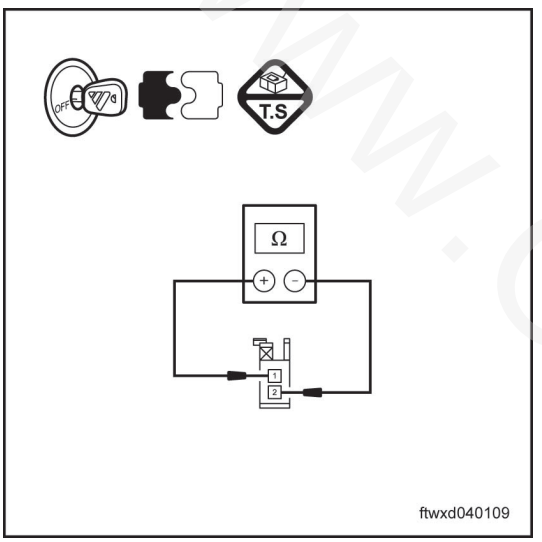
(a) Ignition Switch: OFF.
(b) Dismount the speakers. see “Chapter 66 Audio system - speaker assembly,replacement”)
(c) Check the speakers for damaged cones.



(d) Use a multimeter to measure the resistance between pin 1 and pin 2 of the front speaker.

Standard voltage

Multimeter connection	Standard value
1-2	4 Ω



(e) Use a multimeter to measure the resistance between pin 1 and pin 2 of the rear speaker.

Standard voltage

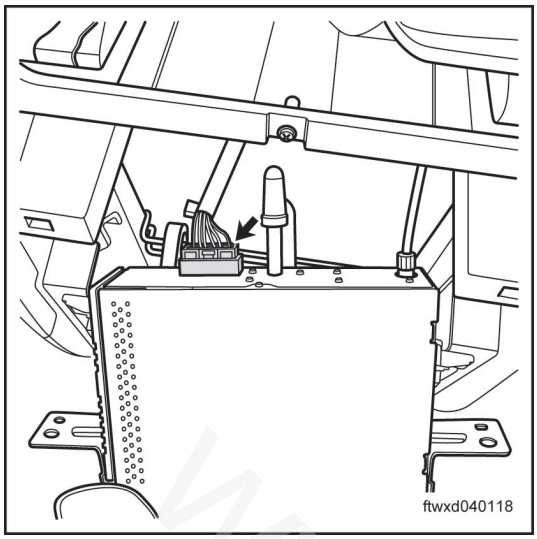
Multimeter connection	Standard value
1-2	4 Ω

Check whether the result is normal?

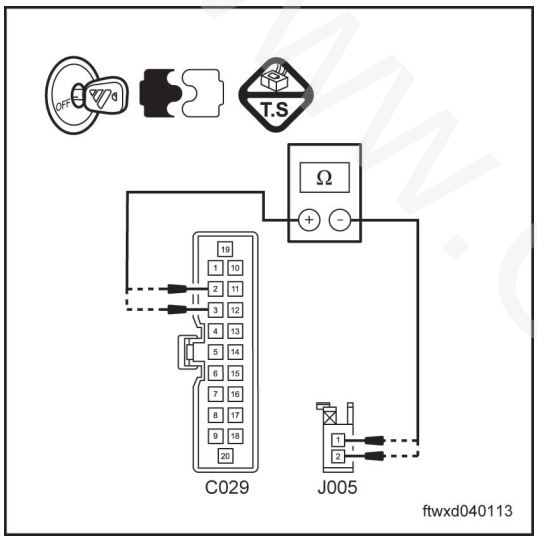
Yes> go to step 3

No > Replace the speakers.

3 . Check the circuits of speakers



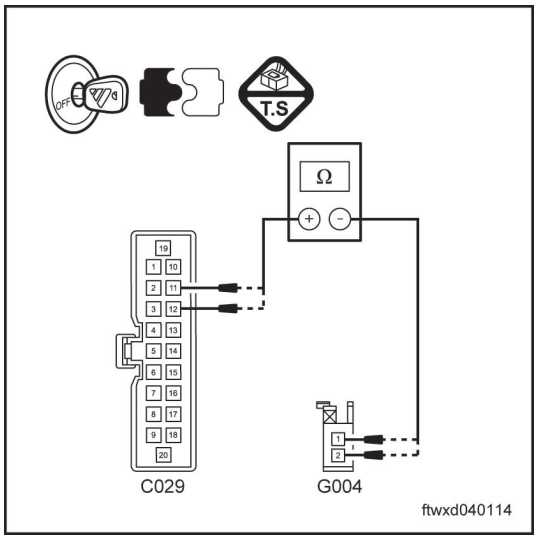
(a) Disconnect the connectors of acoustics unit.



(b) Use a multimeter to measure the resistance between pins 2 and 3 of connector C029 of acoustics unit and pins 1 and 2 of connector J005 of speaker of front left door.

Standard electrical resistance (check whether there existent an open circuit)

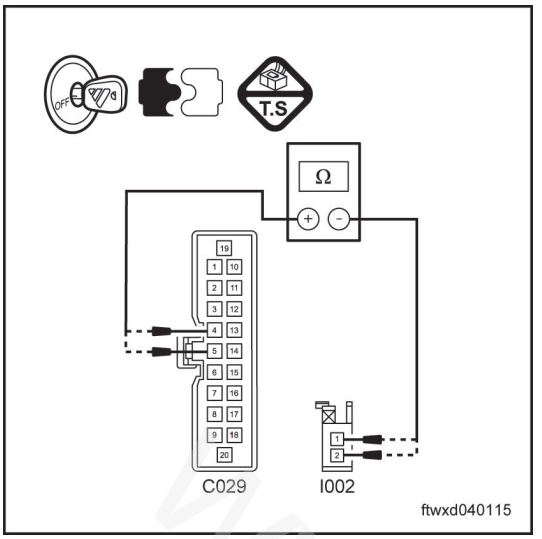
Multimeter connection	Standard value
C029(2)-J005(1)	⩽ 2 Ω
C029(3)-J005(2)	⩽ 2 Ω



(c) Use a multimeter to measure the resistance between pins 11 and 12 of connector C029 of acoustics unit and pins 1 and 2 of connector G004 of speaker of front right door.

Standard electrical resistance (check whether there existent an open circuit)

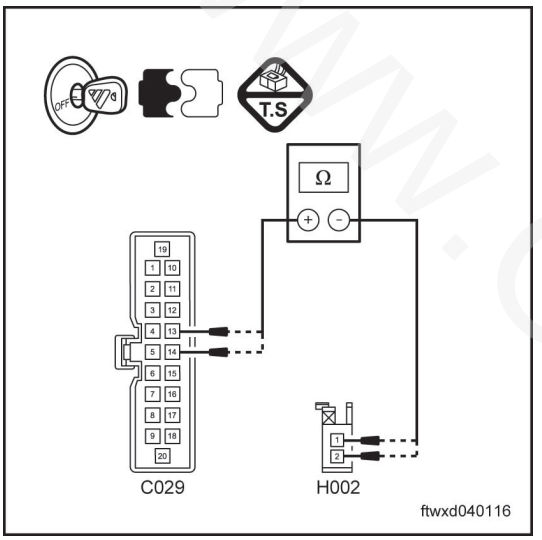
Multimeter connection	Standard value
C029(11)-G004(1)	⩽ 2 Ω
C029(12)-G004(2)	⩽ 2 Ω



(d) Use a multimeter to measure respectively the resistance between pins 4 and 5 of connector C029 of acoustics unit and pins 1 and 2 of connector J002 of speaker of rear left door.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C029(4)-I002(1)	⩽ 2 Ω
C029(5)-I002(2)	⩽ 2 Ω



(e) Use a multimeter to measure respectively the resistance between pins 13 and 14 of connector C029 of acoustics unit and pins 1 and 2 of connector H002 of speaker of rear right door.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C029(13)-H002(1)	⩽ 2 Ω
C029(14)-H002(2)	⩽ 2 Ω

Check whether the result is normal?

Yes> go to step 4

No > Repair the open circuit between connector C029 of acoustics unit and the speakers.

4 . Make comparison with similar vehicle models

(a) Set the acoustics unit “FAD” and “BAL” to one level.

(b) Make comparison with similar vehicle models

Check whether or not the volume of speakers is identical?

Yes > complete

No > Replace the CD/DVD acoustics unit

SPEAKERS MAKE POOR-QUALITY SOUND ONLY WHEN PLAYING BACK CD/DVD

Diagnostic steps

1 . Check the CD/DVD media source files

(a) Change for a CD/DVD source file known as legal copy, and play it back.

Check the speakers for normal tone quality?

Yes > Please use genuine CDs/DVDs.

No> go to step 2

2 . Check the setup of the acoustics unit

(a) Ignition Switch: ON.

(b) Push the power switch of acoustics unit.

(c) Set the volume of acoustics unit to over 10VOL.

(d) Set the “FAD” and “BAL” to their initial settings.

(e) Push and hold “VOL” for at least 2 seconds to turn on the loudness function.

(f) In CD/DVD mode, push the “CD/DVD” key successively, and select the tone field modes “FLAT”, “JAZZ”, “POP”, “CLASSIC”, “ROCK” and “VOCAL” as per the type of music played back.

Check the speakers for normal tone quality?

Yes > CD/DVD acoustics unit is set up improperly.

No > Replace the CD/DVD acoustics unit

NO RADIO STATIONS CAN BE RECEIVED OR THE RECEIVING EFFECT IS POOR

Diagnostic steps

1 . Check the setup of the acoustics unit

(a) Ignition Switch: ON.
(b) Push the power switch “PWR” of acoustics unit.
(c) Set the volume of acoustics unit to over 10VOL.
(d) Push repeatedly “BAND” to select frequency channel “FM1”.
(e) Allow the acoustics unit to conduct automatic station searching.

Does the automatic station searching function of acoustics unit work normally?

Yes > Replace the acoustics unit.

No> go to step 2

2 . Check the antenna of the acoustics unit

(a) Check the antenna for bending or deformation.
(b) Check the antenna for foreign matter covering.

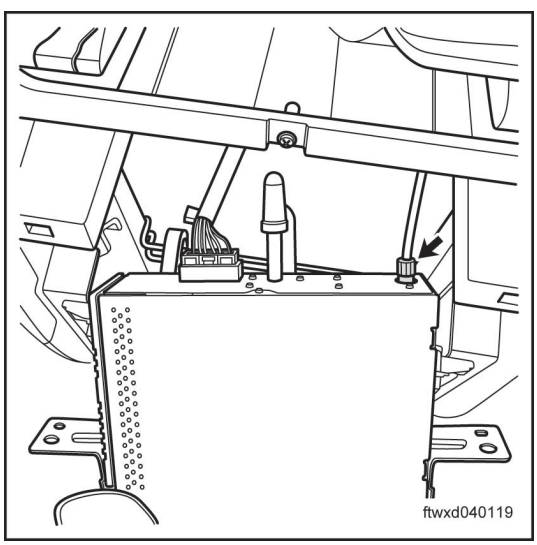
Check whether the result is normal?

Yes> go to step 3

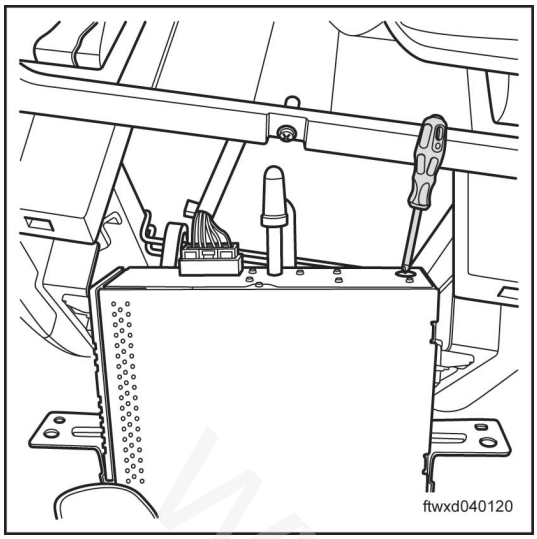
No > Replace the antenna.

3 . Check the acoustics unit

(a) Ignition Switch: OFF.



(b) Remove the antenna connector of the acoustics unit.



(c) Ignition Switch: ON.
(d) Push the power switch of acoustics unit.
(e) Set the volume of acoustics unit to over 10VOL.
(f) Push repeatedly “BAND” to select frequency channel “FM1”.
(g) Put a screwdriver, fine conductor or other metal object onto the antenna socket of acoustics unit, and check and verify that broadcast may be received.

Check whether or not the acoustics unit can receive broadcast?

Yes> go to step 4

No > Replace the acoustics unit.

4 . Check the antenna cable

(a) Ignition Switch: OFF.
(b) Disconnect the antenna cable connector.

Check the both ends of antenna cable for continuity.

Yes > Replace the antenna.

no > clean and tighten the connectors between antenna cable and antenna, and the connectors between antenna cable and acoustics unit. If the problem remains the same, replace the antenna cable.

CD/DVD CANNOT BE INSERTED/PLAYED BACK, OR CD/DVD IS EJECTED IMMEDIATELY ONCE IT IS INSERTED

Diagnostic steps

1 . Check whether or not a proper CD/DVD is inserted

(a) Ensure that the CD/DVD is an audio CD/DVD free of deformation, defect, filth, scribes or failure.

⚠ CAUTION

- **Semitransparent or unique-shaped CDs/DVDs cannot be played back.**
- **CDs/DVDs attached with sticky paper labels shall not be played back.**
- **Commercial audio or audio-visual CDs/DVDs may be played back.**
- **For details about CDs/DVDs that may be played back, see "operating instruction manual for the acoustics system".**

Check whether the result is normal?

Yes> go to step 2

No > Replace and use proper CDs/DVDs.

2 . Check whether or not the CDs/DVDs are inserted properly

(a) Check whether or not the CDs/DVDs are inserted upside down.

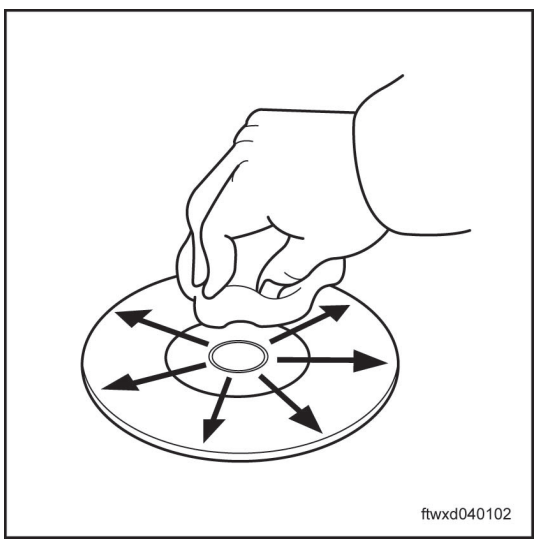
Check whether the result is normal?

Yes> go to step 3

No > Please insert CDs/DVDs correctly (see "operating instruction manual for acoustics system")

3 . Check the CDs/DVDs

(a) Check whether or not the CDs/DVDs are too dirty.



(b) If yes, wipe and clean the CDs from interior to exterior in radial direction with soft cloth, as shown in the figure.

⚠ CAUTION

Do not use ordinary CD cleanser or anti-static protective material.

(c) Insert a CD/DVD

Check the acoustics unit for normal playback?

Yes > Please use clean CDs/DVDs.

No> go to step 4

4 . Check the CD/DVD media source files

(a) Change for a CD/DVD source file known as legal copy, and play it back.

Check the acoustics unit for normal playback?

Yes > Please use genuine CDs/DVDs.

No> go to step 5

5 . Check the acoustics unit

(a) Check the core for foreign matters.

(b) Check the core for existing CD.

(c) Check whether or not the core is already set to CD-inserted status; in such a case, push and hold the ejection key to reset the core.

Check whether the result is normal?

Yes > Replace the CD/DVD acoustics unit

no > remove the existing CD, and reset the core. If there is any foreign matter, sent the player to appointed service points for maintenance.

CD/DVD TUNE SKIPPING

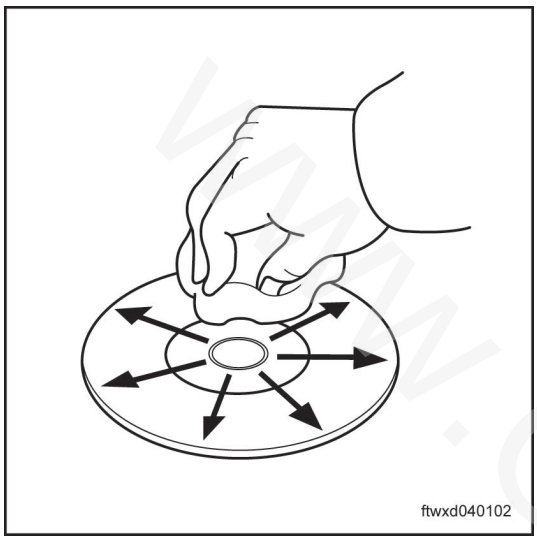
Diagnostic steps

⚠ CAUTION

CD/DVD tune skipping may take place sometimes when the vehicle is running on uneven pavement.

1 . Check the CDs/DVDs

(a) Ensure that the CD/DVD is free of deformation, filth and scribes.



(b) If yes, wipe and clean the CDs from interior to exterior in radial direction with soft cloth, as shown in the figure.

⚠ CAUTION

Do not use ordinary CD cleanser or anti-static protective material.

(c) Insert a CD/DVD

Check whether the result is normal?

Yes> go to step 2

No > Replace the vehicle-door master-control switch.

2 . Check the CD/DVD media source files

(a) Change for a CD/DVD source file known as legal copy, and play it back.

Check the acoustics unit for normal playback?

Yes > Please use genuine CDs/DVDs.

No> go to step 3

3 . Check the acoustics unit

(a) Check the acoustics unit for correct installation.

(b) Check whether or not the fixed bolts of acoustics unit are properly tightened.

(c) Check whether or not the operating site of acoustics unit is kept away from dust.

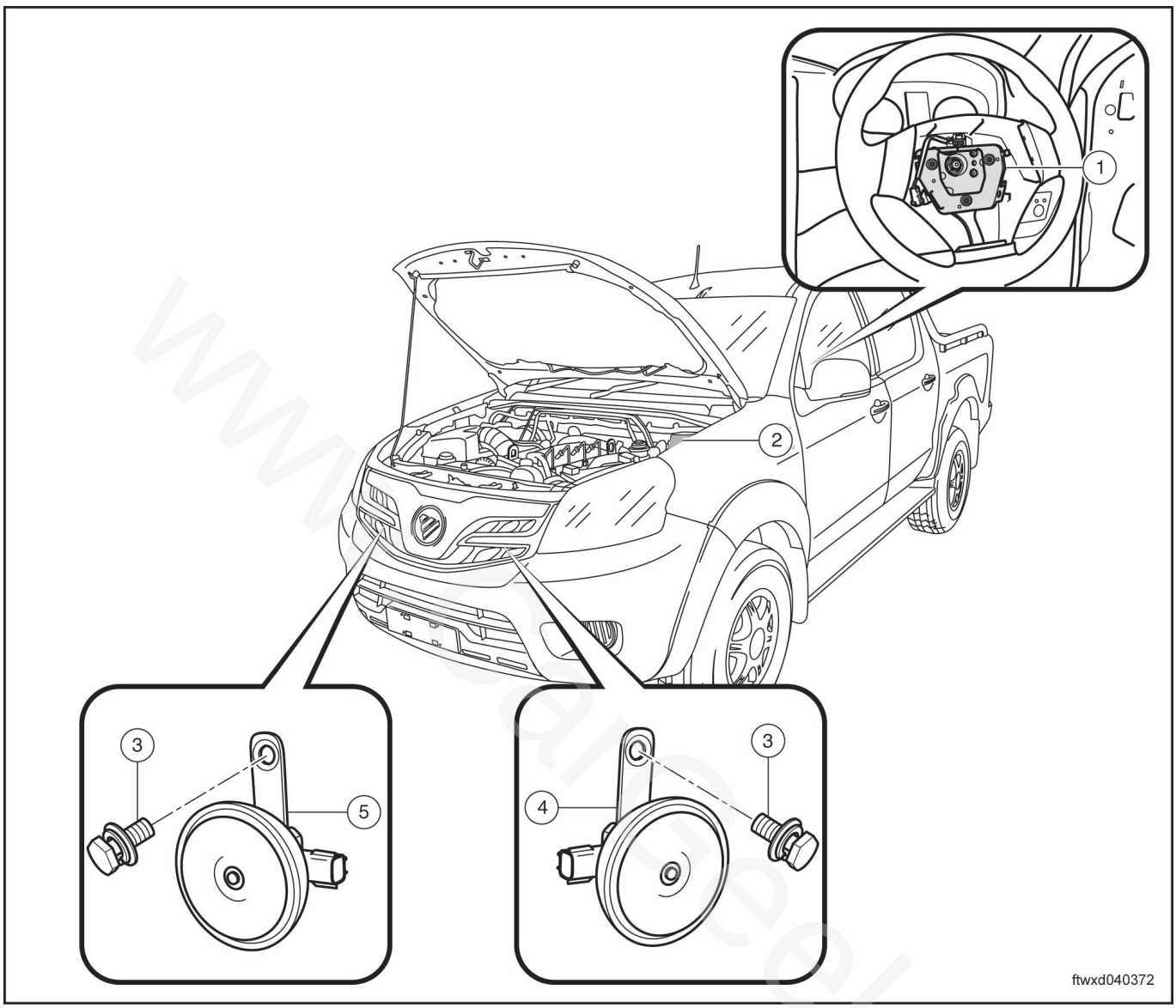
Check whether the result is normal?

Yes > Replace the CD/DVD acoustics unit

no > Reinstall the acoustics unit and keep it away from dust.

HORN

COMPONENTS DRAWING



1	Horn button
2	Fuse box, engine compartment
3	Hexagonal bolt

4	Althorn
5	Bass horn

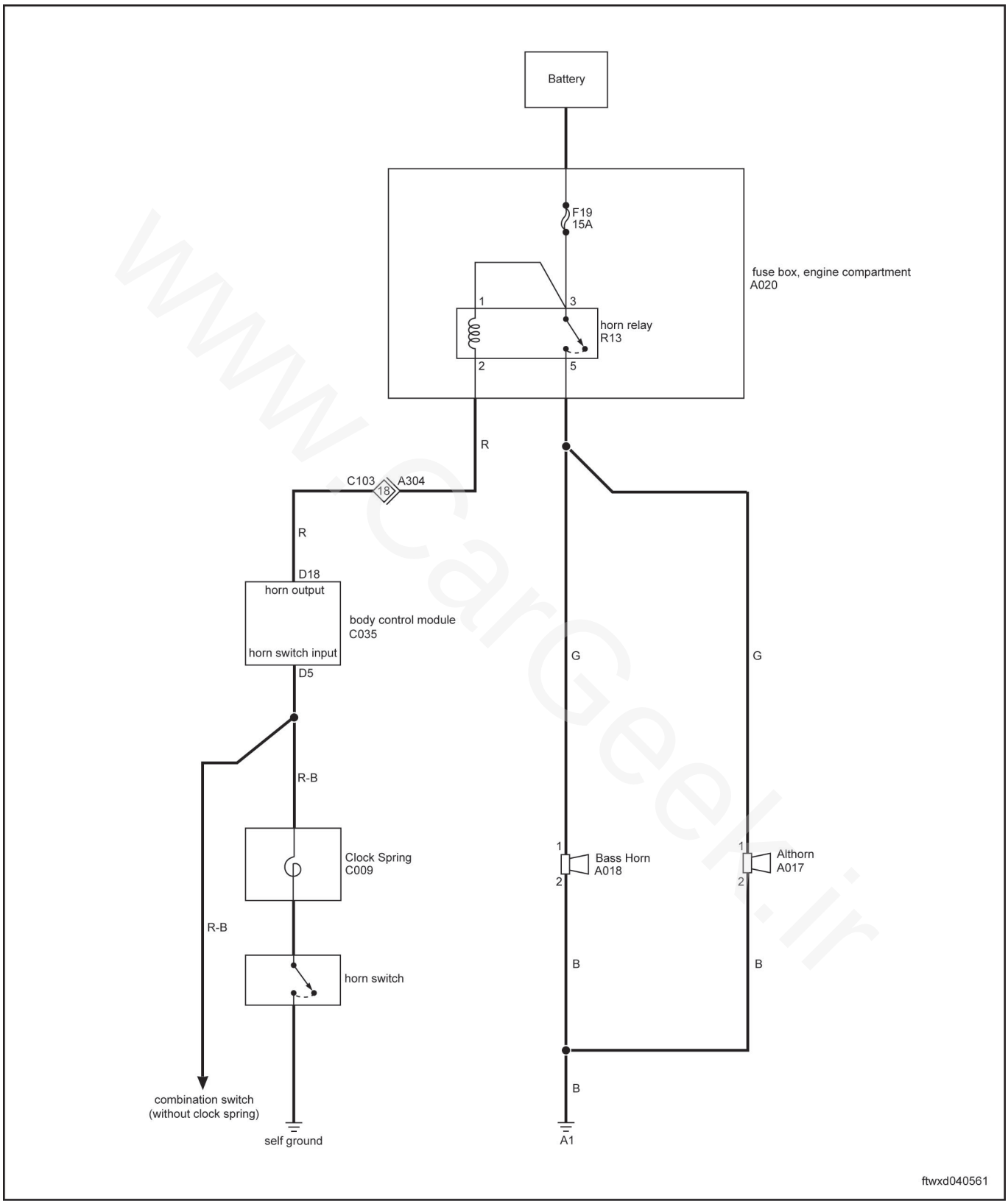
DEFECT PHENOMENON FORM

When checking DTC in the checking module, if certain DTC displayed, then the circuit of the code listed in the following list should be checked. The detailed description of each DTC can refer to corresponding pages.

DTC code	Diagnostic items (DTC definition)	Trouble location
B1385	Open circuit of horn control circuit	• fuse • Horn relay • Horn switch • Control circuit
B1386	High current of horn control circuit	• fuse • Horn relay • Horn switch • Control module, engine • Control circuit

B1385 OPEN CIRCUIT OF HORN CONTROL CIRCUIT
B1386 HIGH CURRENT OF HORN CONTROL CIRCUIT

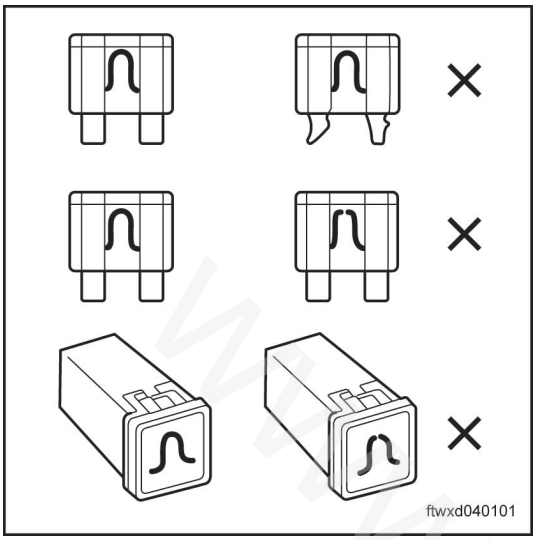
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check fuse inside fuse box, engine compartment : F19 (15A).

Check whether the result is normal?

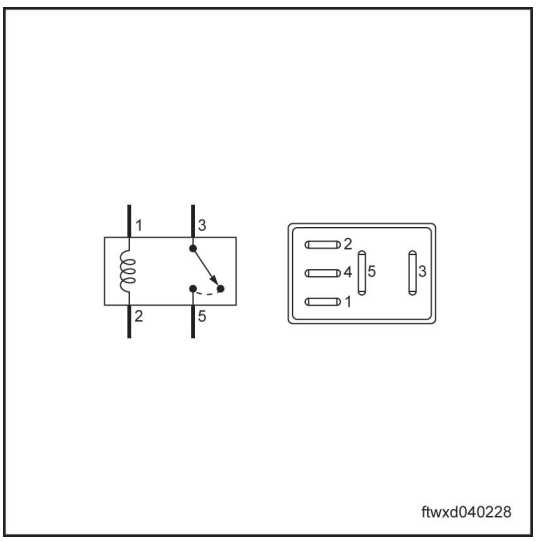
Yes> go to step 2

No> replace fuse

2 . Check the horn relay

(a) Ignition Switch: OFF.

(b) Unplug the horn relay R13.



(c) Measure the electrical resistance based on the value in the following form.

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Normal situation	1-2	Breakover
Apply power supply voltage to position between stitch 1 and 2,	3-5	< 2 Ω

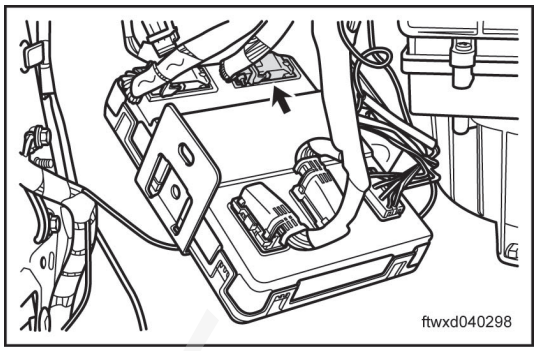
Check whether the result is normal?

Yes> go to step 3

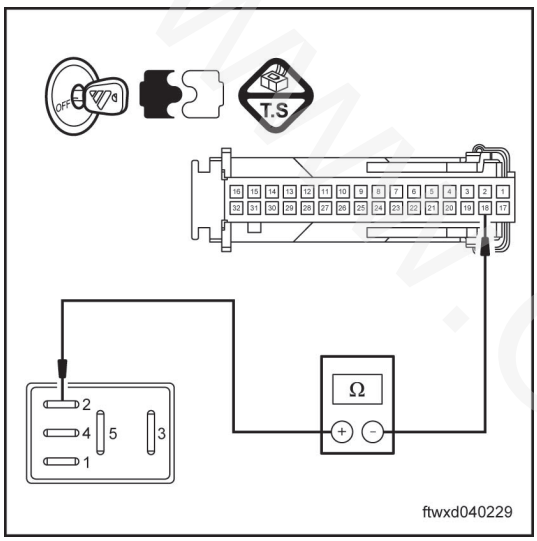
No > Replace the horn relay.

3 . Check the harness and connectors (horn relay - BCM control unit)

(a) Ignition Switch: OFF.
(b) Unplug the horn relay R13.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R13（2）-C035（D18）	＜2 Ω

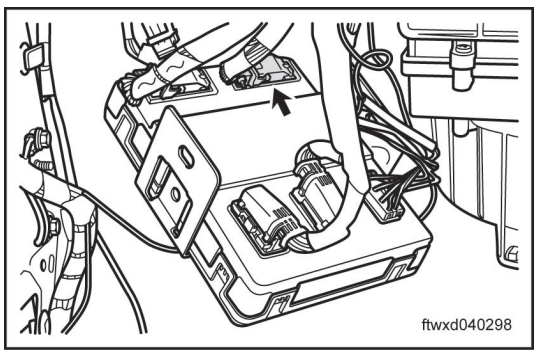
Check whether the result is normal?

Yes> go to step 4

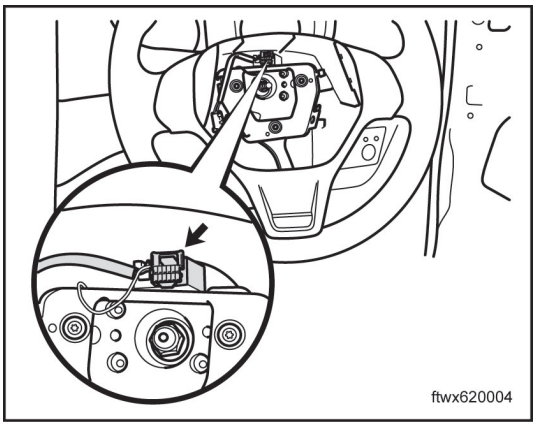
No > Maintenance or replace harness.

4 . Check the harness and connector (BCM control unit - clock spring)

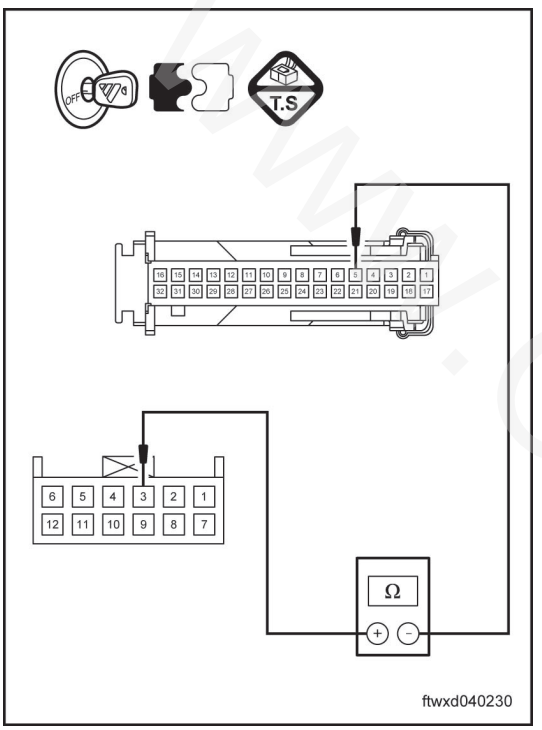
(a) Ignition Switch: OFF.



(b) Disconnect connector C035, BCM control unit.



(c) Disconnect the connector of lock spring C009.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C035（D5）-C009（3）	＜2 Ω

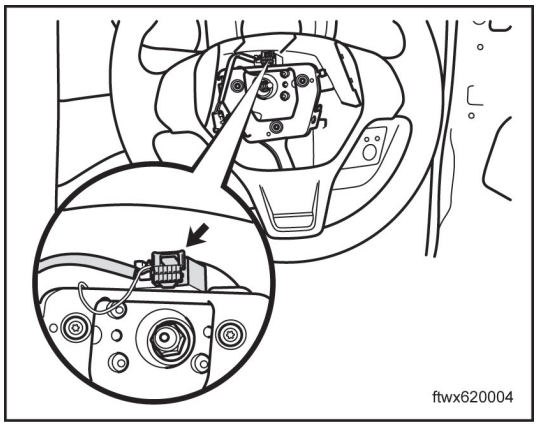
Check whether the result is normal?

Yes> Replace BCM control unit.

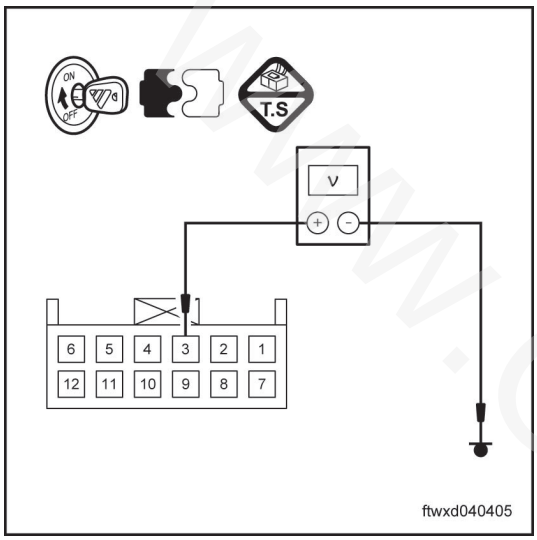
No > Maintenance or replace harness.

5 . Check the harness and connector (clock spring – horn switch)

(a) Ignition Switch: OFF.



(b) Disconnect the connector of lock spring C009.
(c) Disconnect the horn switch connector.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C009 (3) - horn switch	< 2 Ω

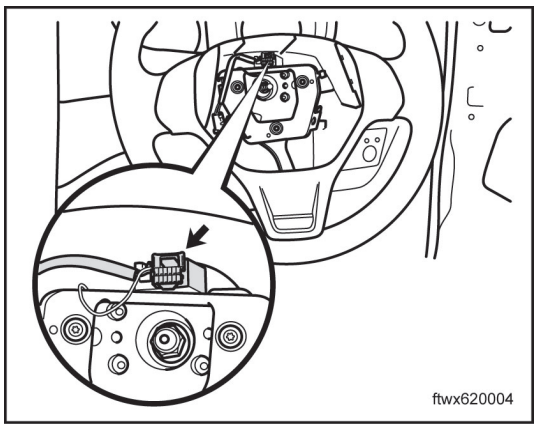
Check whether the result is normal?

Yes > Replace the clock spring.

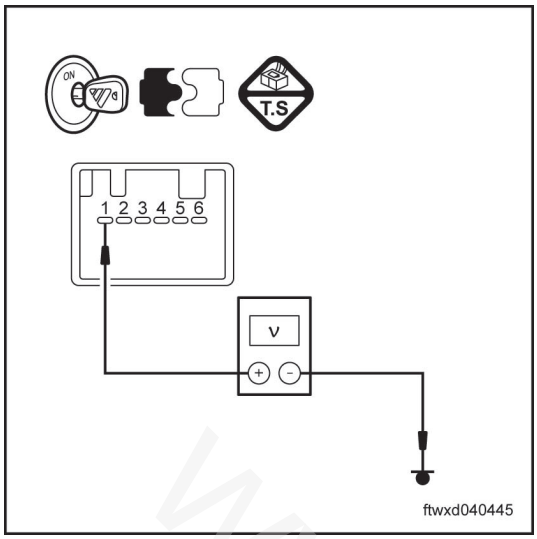
No > Maintenance or replace harness.

6 . Check the harness and connectors (horn switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector of lock spring C009.
(c) Disconnect the horn switch.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
Horn switch - ground	< 2 Ω

Check whether the result is normal?

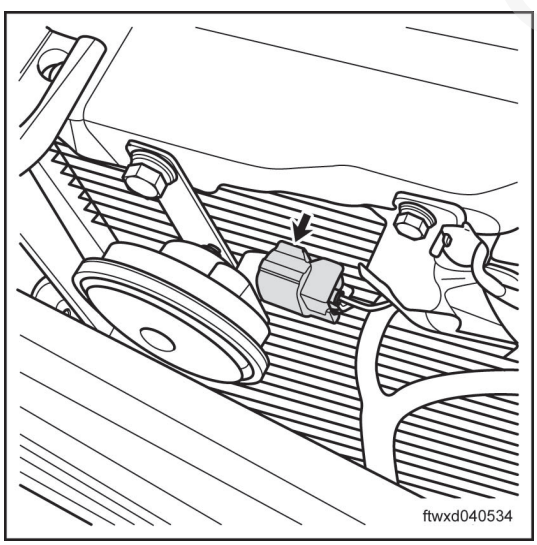
Yes > Replace the horn switch.

No > Maintenance or replace harness.

7 . Check the harness and connectors (horn relay - horn)

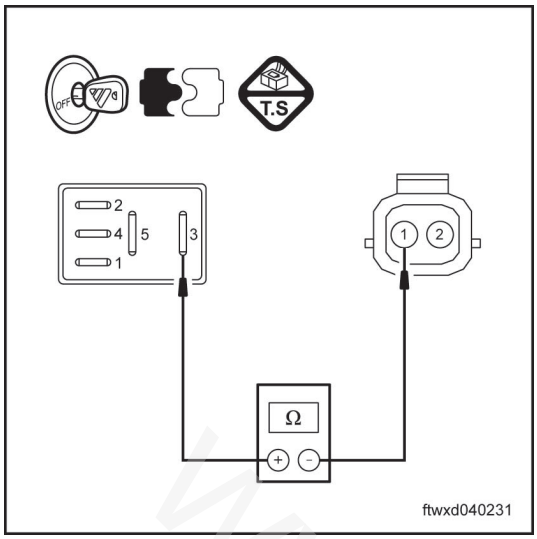
(a) Ignition Switch: OFF.

(b) Unplug the horn relay R13.



(c) Disconnect the connector A018 of bass horn.

(d) Disconnect the connector A017 of althorn.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R13（5）-A018（1）	＜2 Ω
R13（5）-A017（1）	

04

Check whether the result is normal?

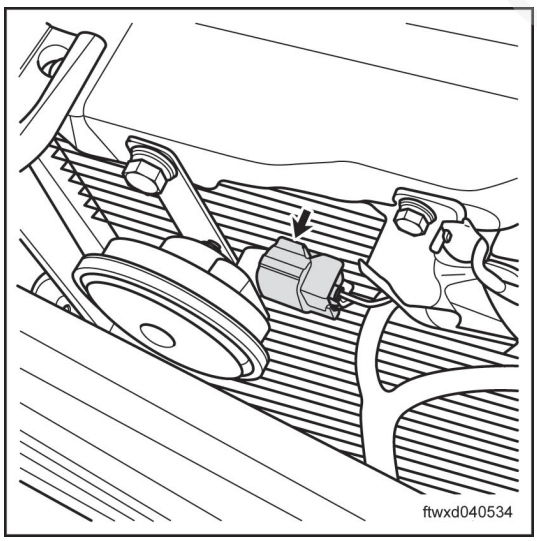
Yes> go to step 8

No > Maintenance or replace harness.

8 . Check the harness and connectors (horn - ground)

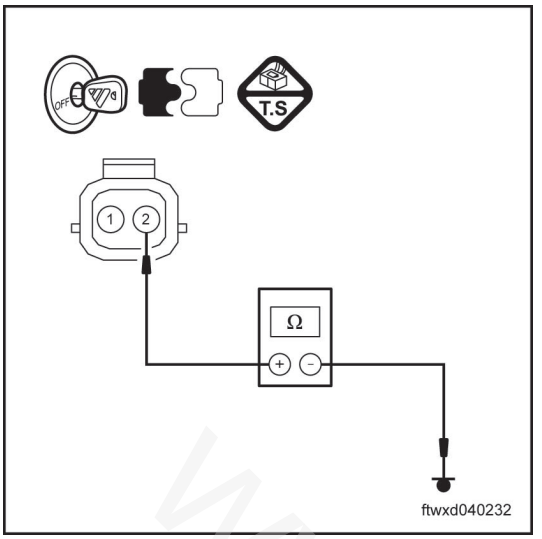
(a) Ignition Switch: OFF.

(b) Unplug the horn relay R13.



(c) Disconnect the connector A018 of bass horn.

(d) Disconnect the connector A017 of althorn.



Check whether the result is normal?

Yes > Replace the horn.

No > Maintenance or replace harness.

(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A018 (2) - ground	< 2 Ω
A017 (2) - ground	

LIGHTING SYSTEM

PRECAUTION

1 . Precautions for usage of battery during inspection

(a) To use the battery for inspection, do not allow the tester probes of positive pole and negative pole to abut against each other so as not to cause a short circuit.

2 . Precautions for replacement of the headlight bulbs

(a) Any contamination of engine oil will reduce the lifecycle of the halogen bulbs.

(b) Since the interior of the halogen bulb is highly pressurized, handle it with great care. If the bulb is dropped, it may explode and cause personal injury.

(c) Do not directly touch the bulb by hand.

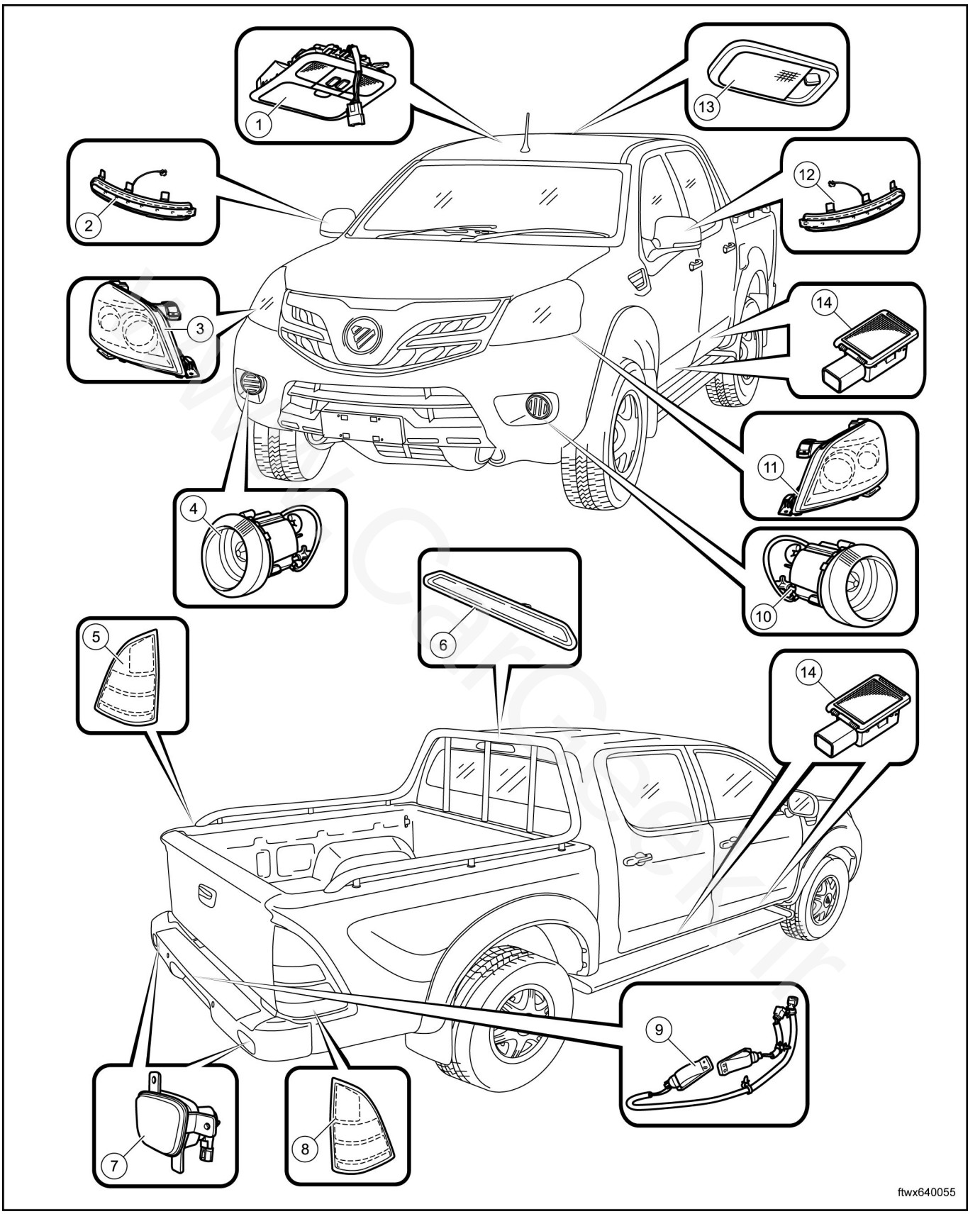
(d) Always use a bulb of the same wattage for replacement.

(e) Once the bulb is installed, fix the bulb cover with care,Otherwise moisture may enter the combination lamp. and make it cloudy or steamy.

3 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

COMPONENTS DRAWING



1	Front interior lamp assembly
2	Right turning signal assembly
3	Front combination lamp assembly RH
4	Front fog lamp assembly RH
5	Rear combination lamp assembly LH
6	Top braking lamp
7	Rear fog lamp LH/RH
8	Rear combination lamp assembly RH
9	Rear license plate lamp assembly
10	Front fog lamp assembly LH
11	Front combination lamp assembly LH
12	Left turning signal assembly
13	Rear interior lamp assembly
14	Step lamp

BASIC INSPECTION

Steps	Inspection contents		Measures
1	**Check Battery voltage** • Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Charge or replace the battery. See "Chapter 20. Battery - Battery")
2	**Check the passing lamps.** • Ignition Switch: ON. • Use the combination switch to turn on the passing lamps. **Check whether the result is normal?**	Yes	No> go to step 3
		No?	Go to defect phenomenon form
3	**Check the driving lights.** • Use the combination switch to turn on the driving lights. **Check whether the result is normal?**	Yes	No> go to step 4
		No?	Go to defect phenomenon form
4	**Check the cut-in lamps.** • Use the combination switch to turn on the cut-in lamps. **Check whether the result is normal?**	Yes	No> go to step 5
		No?	Go to defect phenomenon form
5	**Check the turn lights.** • Use the combination switch to turn on the turn lights. **Check whether the result is normal?**	Yes	No> go to step 6
		No?	Go to defect phenomenon form
6	**Check the hazard warning lamps.** • Use the hazard warning switch to turn on the hazard warning lamps. **Check whether the result is normal?**	Yes	No> go to step 7
		No?	Go to defect phenomenon form
7	**Check the room lamp.** • Use the room lamp switch to turn on the room lights. **Check whether the result is normal?**	Yes	Check the harness
		No?	Go to defect phenomenon form

DEFECT PHENOMENON FORM

Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

1 . Headlights

Defect phenomenon	Suspect Area	Reference
Passing lamp on 1 side fails to go on	1. Bulb	Chapter 64 Lighting – bulb of front combination lamp assembly LH, replacement
	2. Harness	-
Passing lamps on 2 sides fail to go on	1. Bulb	Chapter 64 Lighting – bulb of front combination lamp assembly LH, replacement
	2. Relay	-
	3. Harness	-
	4. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
Driving light on 1 side fails to go on	1. Bulb	Chapter 64 Lighting – bulb of front combination lamp assembly LH, replacement
	2. Harness	-
Driving lights on 2 sides fail to go on	1. Relay	-
	2. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	3. Harness	-
Driving light and passing lamp on 1 side fail to go on	1. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	2. Bulb	Chapter 64 Lighting – bulb of front combination lamp assembly LH, replacement
	3. Harness	-
Driving light and passing lamp on 2 sides fail to go on	1. Relay	-
	2. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	3. Harness	-

2 . Fog lamp

Defect phenomenon	Suspect Area	Reference
Front fog lamp on 1 side fails to go on	1. Bulb	Chapter 64 Lighting – bulb of front fog lamp LH, replacement

Defect phenomenon	Suspect Area	Reference
	2. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	3. Harness	-
Front fog lamps on 2 sides fail to go on	1. Fuse	-
	2. Relay	-
	3. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	4. Harness	-
Front fog lamp is constantly on	1. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	2. Front fog lamp relay	-
	3. Harness	-
Rear fog lamp on 1 side fails to go on	1. Bulb	Chapter 64 Lighting – bulb of rear combination lamp assembly LH, replacement
	2. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	3. Harness	-
Rear fog lamps on 2 sides fail to go on	1. Bulb	Chapter 64 Lighting – bulb of rear combination lamp assembly LH, replacement
	2. Rear fog lamp switch	Chapter 64 Lighting - the rear fog lamp switch，transmission,
	3. 3-in-1 controller	-
	4. Harness	-
Rear fog lamp is constantly on	1. Rear fog lamp switch	Chapter 64 Lighting - the rear fog lamp switch，transmission,
	2. 3-in-1 controller	-
	3. Harness	-

3 . Turn lights and hazard warning lamps

Defect phenomenon	Suspect Area	Reference
Hazard warning lights fail to go on (turn lights work normally)	1. Fuse	-
	2. Hazard warning switch	Chapter 83. Dashboard/instruments - instrument panel, replacement
	3. 3-in-1 controller	-
	4. Harness	-

Defect phenomenon	Suspect Area	Reference
Turn lights fail to go on (hazard warning lamps work normally)	1. Fuse	-
	2. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	3. 3-in-1 controller	-
	4. Harness	-
Turn lights and hazard warning lamps fail to go on	1. 3-in-1 controller	-
	2. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	3. Harness	-
Turn light on 1 side fails to go on	1. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	2. 3-in-1 controller	-
	3. Harness	-
Hazard warning lamps are constantly on	1. 3-in-1 controller	-
	2. Hazard warning switch	Chapter 83. Dashboard/instruments - instrument panel, replacement
	3. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	4. Harness	-

4 . Brake lamps

Defect phenomenon	Suspect Area	Reference
Brakes lamps on 2 sides fail to go on	1. Fuse	-
	2. Brake lamp switch	Chapter 35 Driving braking - brake pedal, replacement
	3. Harness	-
Brakes lamp on 1 side fails to go on	1. Bulb	Chapter 64 Lighting – bulb of rear combination lamp assembly LH, replacement
	2. Harness	-
Top brakes lamps fail to go on	1. Bulb	Chapter 88 Interior & exterior trims - spoiler assembly, replacement
	2. Harness	-

5 . Reverse lamps

Defect phenomenon	Suspect Area	Reference
Reverse lamp on 1 side fails to go on	1. Bulb	Chapter 64 Lighting – bulb of rear combination lamp assembly LH, replacement

Defect phenomenon	Suspect Area	Reference
	2. Harness	-
Reverse lamps on 2 sides fail to go on	1. Fuse	-
	2. Reverse lamp switch	Chapter 41 Transmission - primary shaft and reverse gear, replacement
	3. Bulb	Chapter 64 Lighting – bulb of rear combination lamp assembly LH, replacement
	4. Harness	-

6 . Interior lamp

Defect phenomenon	Suspect Area	Reference
Reading/map lamp fails to go on	1. Bulb	Chapter 64 Lighting – front reading/map lamp, replacement
	2. Front indoor roof lamp switch	Chapter 64 Lighting – front reading/map lamp, replacement
	3. Harness	-
Rear roof lamp fails to go on	1. Bulb	Chapter 64 Lighting – rear roof lamp assembly, replacement
	2. Rear roof lamp switch	Chapter 64 Lighting – rear roof lamp assembly, replacement
	3. Harness	-
Sliding-door step lamp fails to go on	1. Door control switch	Chapter 64 Lighting – step lamp assembly, replacement
	2. Bulb	Chapter 64 Lighting – step lamp assembly, replacement
	3. Harness	-
1. Baggage compartment lamp fails to go on.	1. Bulb	-
	2. Door control switch	Chapter 64 Lighting – step lamp assembly, replacement
	3. Harness	-

7 . Interior background lamp lighting

Defect phenomenon	Suspect Area	Reference
Backlight in combination instrument fails to go on	1. Light emitting diode (LED)	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in electronic clock fails to go on	1. Electronic clock assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-

Defect phenomenon	Suspect Area	Reference
Backlight in hazard switch fails to go on	1. Hazard warning switch assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in 12V power outlet socket fails to go on	1. Power outlet socket	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in cigarette lighter fails to go on	1. Cigarette lighter assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in front air conditioner controller fails to go on	1. Front air conditioner controller	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	
Backlight in radio recorder player fails to go on	1. Radio recorder player assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	
Backlight in rear fog lamp switch fails to go on	1. Rear fog lamp switch assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in rear-view mirror defrosting switch fails to go on	1. Rear-view mirror defrosting switch	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in combined display ails to go on	1 Combined display assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in rear window defrost switch fails to go on	1. Rear window defrost switch assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in rear heater switch (front control) fails to go on	1. Rear heater switch (front control) assembly	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in rear heater switch (rear control) fails to go on	1. Rear heater switch (rear control)	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-

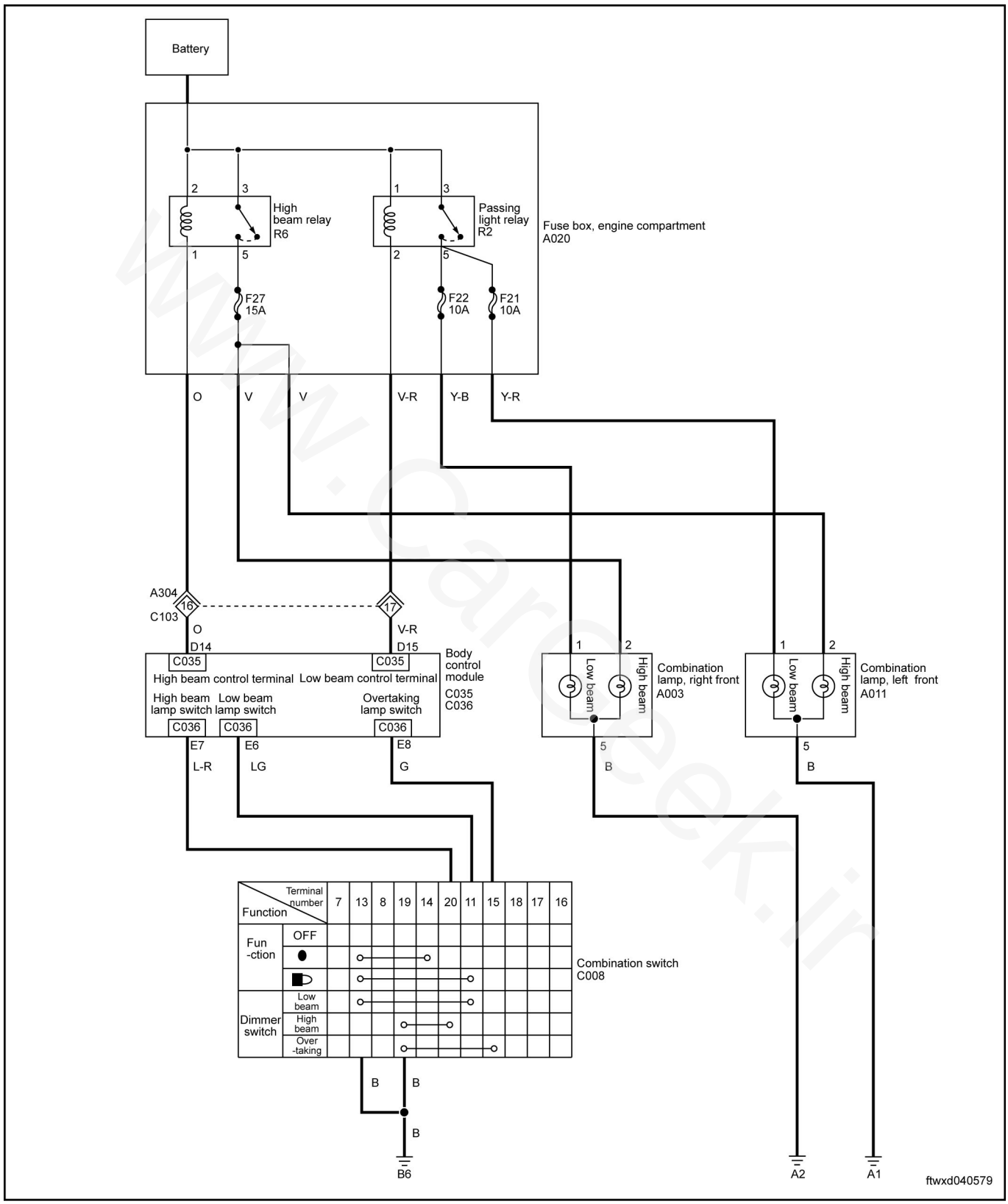
Defect phenomenon	Suspect Area	Reference
Backlight in rear heater controller fails to go on	1. Rear heater controller	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-
Backlight in rear A/C switch (front control) fails to go on	1. Rear A/C switch (front control)	Chapter 83 Dashboard/instruments - combination instrument, replacement
	2. Harness	-

8 . Side-marker lamps, back lamps and license plate lamp

Defect phenomenon	Suspect Area	Reference
Front side-marker lamp fails to go on	1. Bulb	Chapter 64 Lighting – front combination lamp LH, replacement
	2. Harness	-
Rear back lamps fail to go on	1. Bulb	Chapter 64 Lighting – rear combination lamp LH, replacement
	2. Harness	-
License plate lamp fails to go on	1. Fuse	-
	2. Small light relay	-
	3. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	4. Harness	-
No side-marker lamps, back lamps and license plate lamp go on	1. Fuse	-
	2. Relay	-
	3. Combination switch	Chapter 51 Steering gear - combination switch assembly, replacement
	4. Harness	-

B1346 OPEN CIRCUIT OF DRIVING LIGHT CONTROL CIRCUIT
B1347 HIGH CURRENT OF DRIVING LIGHT CONTROL CIRCUIT

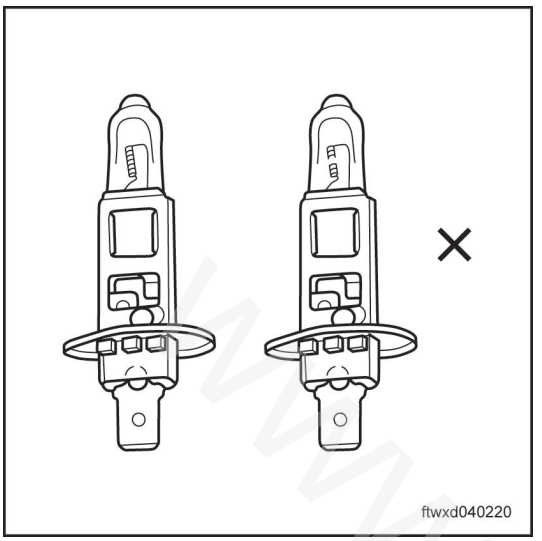
Circuit diagram



Diagnostic steps

1 . Check the bulbs of driving lights.

(a) Ignition Switch: OFF.



(b) Check whether or not the bulbs of front fog lamps are damaged.

Check whether the result is normal?

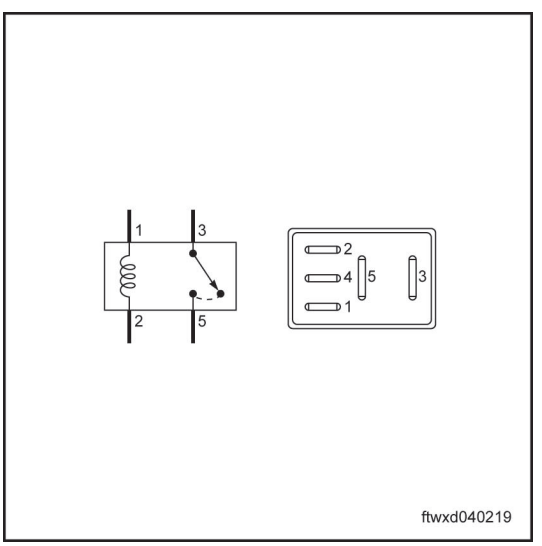
Yes> go to step 2

No > Replace the bulbs of driving lights.

2 . Check the relays of driving lights

(a) Ignition Switch: OFF.

(b) Unplug the relays R6 of driving lights



(c) Check the relays R6 of driving lights.

Standard voltage

Conditions	Connecting pins of multimeter	Specified value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitches 1 and 2,	3 - 5	< 2 Ω

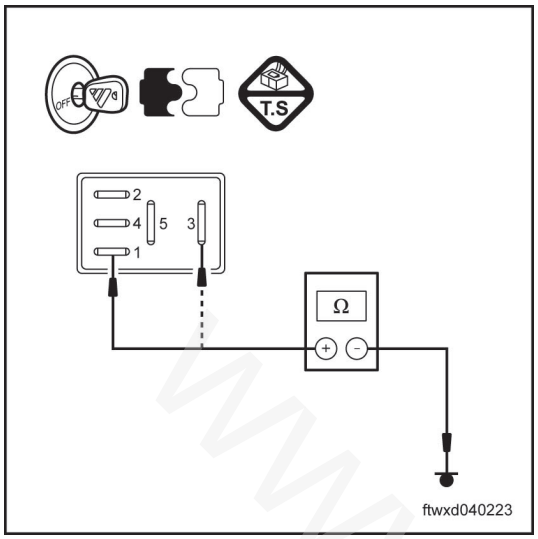
Check whether the result is normal?

Yes> go to step 3

No > Replace the driving light relay.

3 . Check the harness and connectors (driving light relay - supply voltage)

(a) Ignition Switch: OFF.
(b) Unplug the relays R6 of driving lights



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R6 (1) - Ground	9-16V (battery voltage)
R6 (3) - Ground	9-16V (battery voltage)

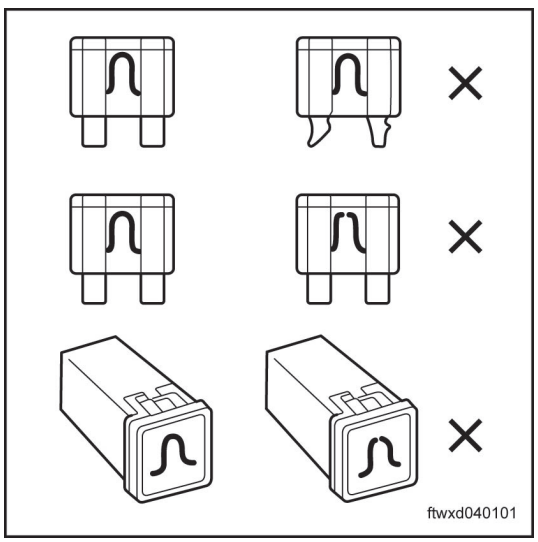
Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

4 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F27 (15A) inside the fuse box of engine compartment.

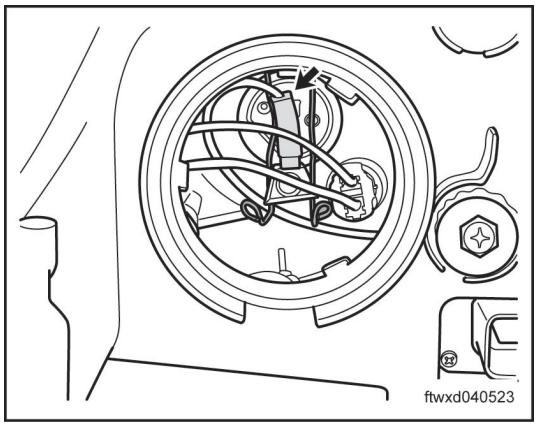
Check whether the result is normal?

Yes> go to step 5

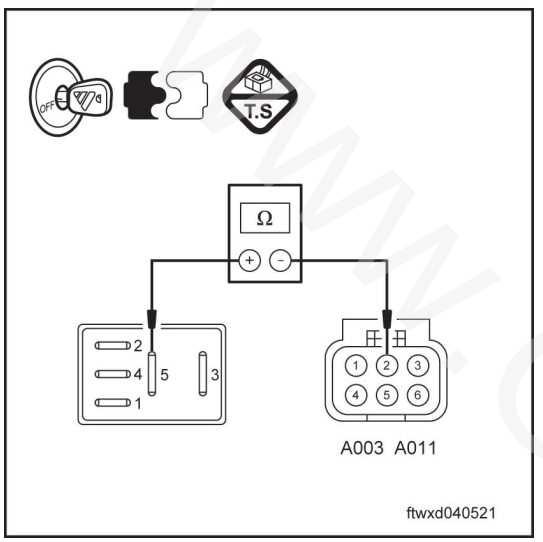
No> replace fuse

5 . Check the harness and connectors (driving light relay – driving light)

(a) Ignition Switch: OFF.
(b) Unplug the relays R6 of driving lights



(c) Disconnect the connector A011 of left front driving light.
(d) Disconnect the connector A003 of right front driving light.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R2（5）-A011（2）	＜2 Ω
R2（5）-A003（2）	

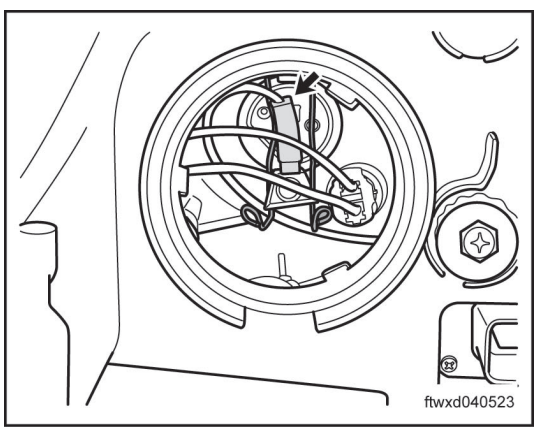
Check whether the result is normal?

Yes> go to step 6

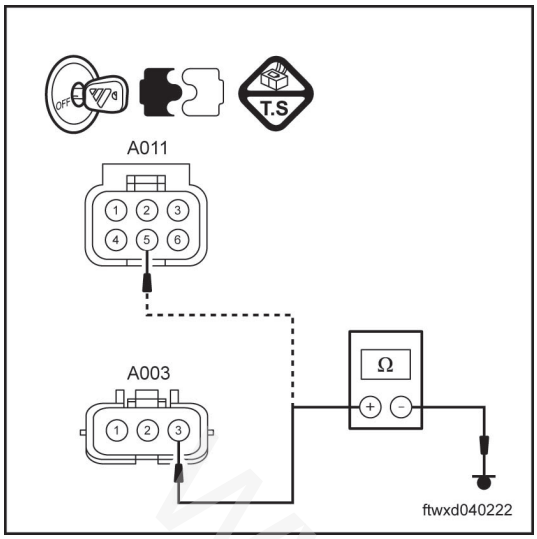
No > Maintenance or replace harness.

6 . Check the harness and connectors (driving light - ground)

(a) Ignition Switch: OFF.
(b) Unplug the relays R6 of driving lights



(c) Disconnect the connector A011 of left front driving light.
(d) Disconnect the connector A003 of right front driving light.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A011 (5) - ground	＜ 2 Ω
A003 (5) - ground	

04

Check whether the result is normal?

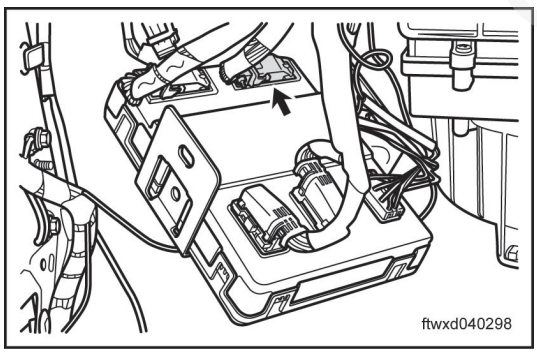
Yes> go to step 7

No > Maintenance or replace harness.

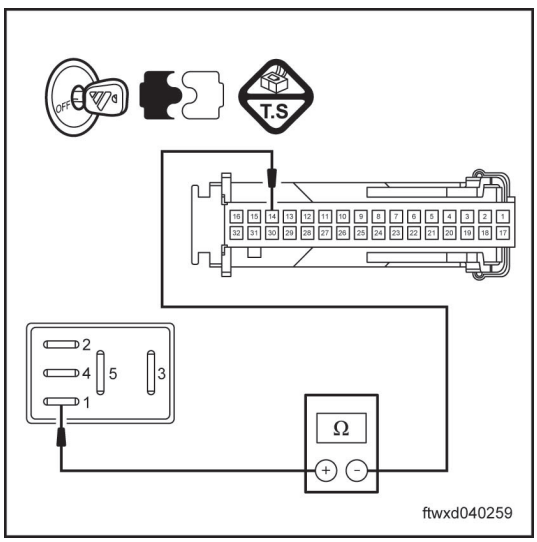
7 . Check the harness and connectors (driving light relay - BCM control unit)

(a) Ignition Switch: OFF.

(b) Unplug the relays R6 of driving lights



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R6(1)-C035（D14）	＜ 2 Ω

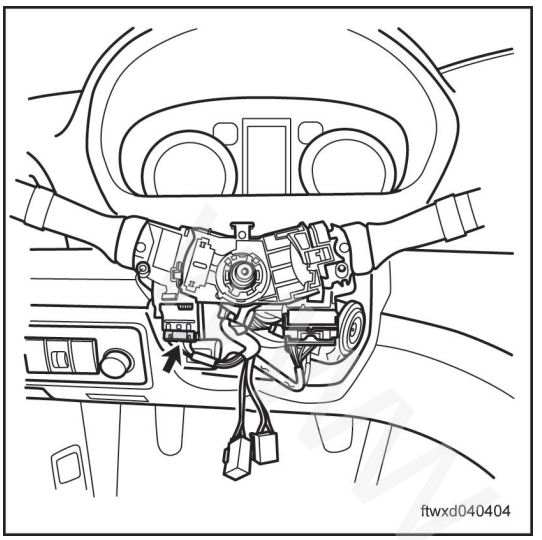
Check whether the result is normal?

Yes> go to step 8

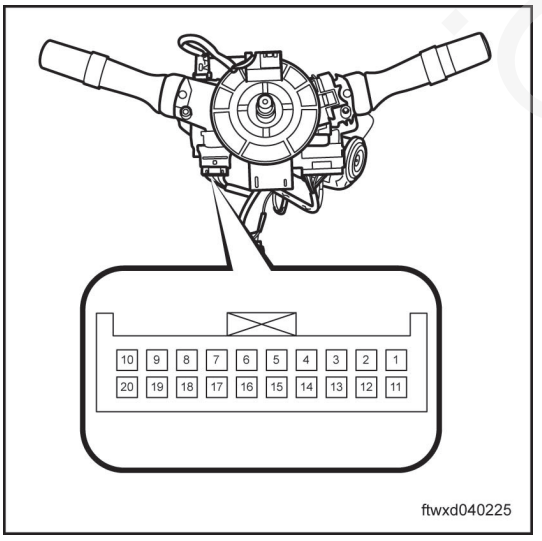
No > Maintenance or replace harness.

8 . Check the combination switch (lamplight switchover)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Check the combination switch (lamplight switchover)

Standard voltage

Conditions	Connecting pins of multimeter	Specified value
Turn off the driving light switch	19-20	⩾ 1 MΩ
Turn on the driving light switch	19-20	< 2 Ω

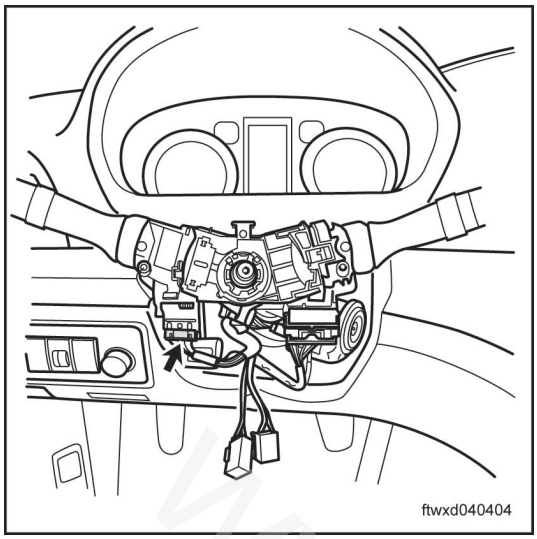
Check whether the result is normal?

Yes> go to step 9

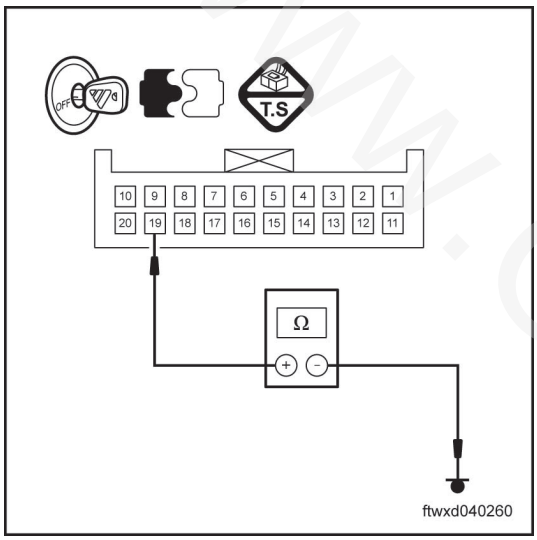
No > Replace the combination switch.

9 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C008 (19) - ground	< 2 Ω

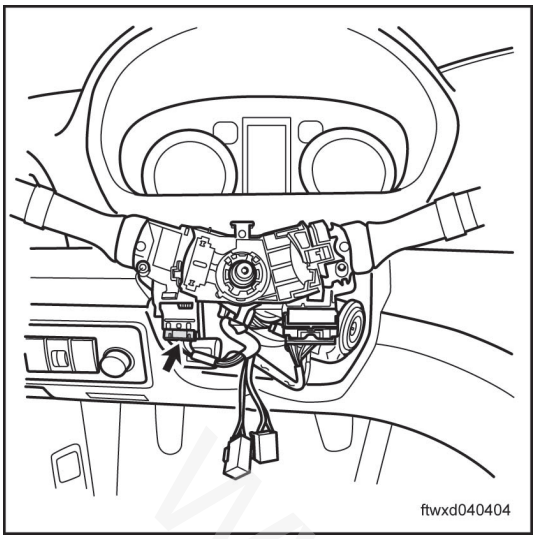
Check whether the result is normal?

Yes> go to step 10

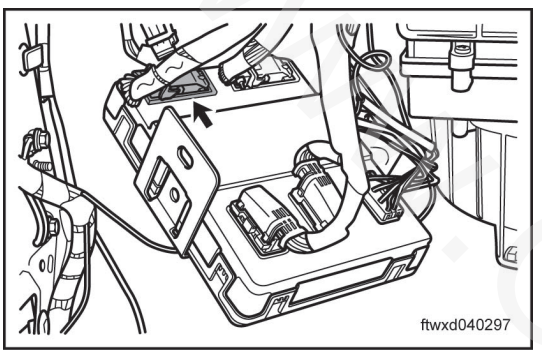
No > Maintenance or replace harness.

10 . Check the wiring harness and connectors (BCM controlling unit - combination switch)

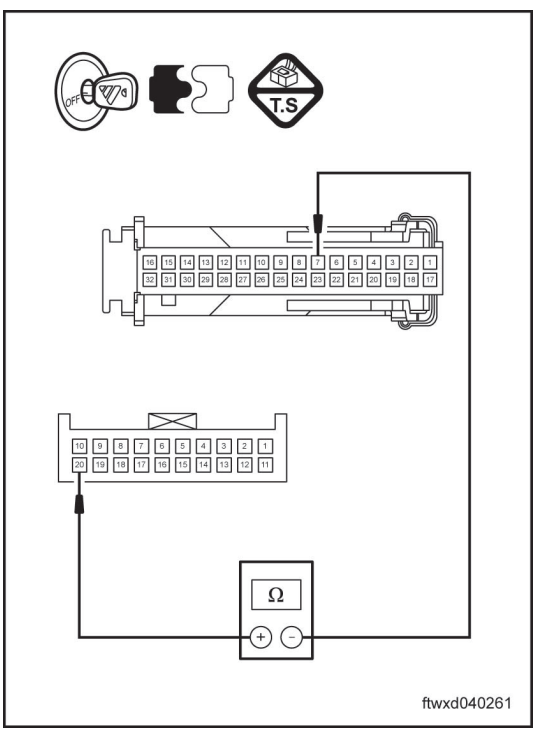
(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C036（E7）-C040（20）	＜2 Ω

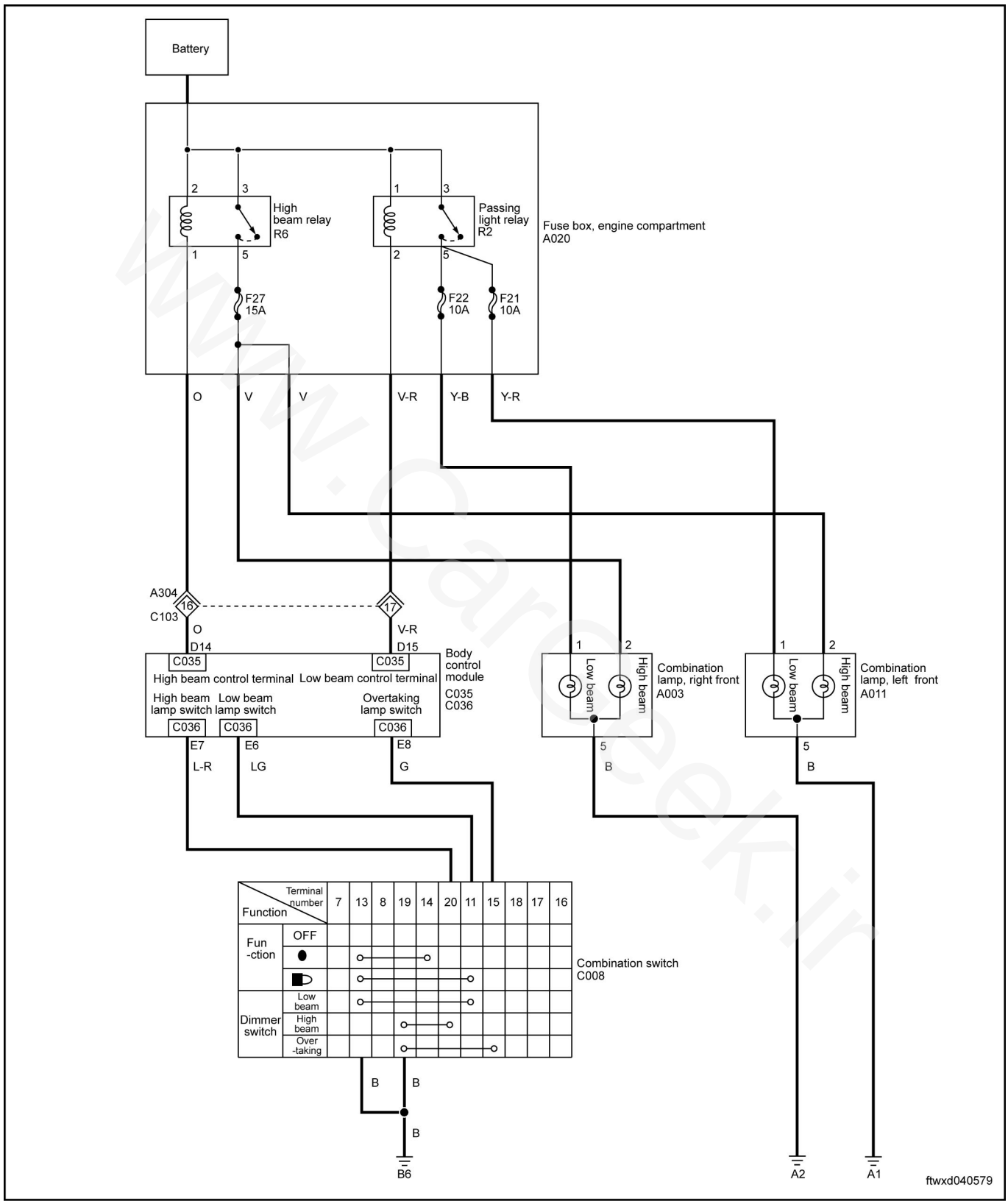
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1344OPEN CIRCUIT OF PASSING LAMP CONTROL CIRCUIT
B1345HIGH CURRENT OF PASSING LAMP CONTROL CIRCUIT

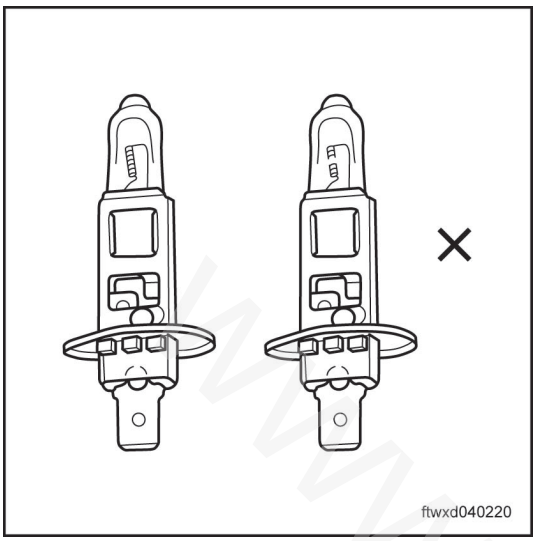
Circuit diagram



Diagnostic steps

1 . Check the low beam bulbs.

(a) Ignition Switch: OFF.



(b) Check whether or not the low beam bulbs are damaged.

Check whether the result is normal?

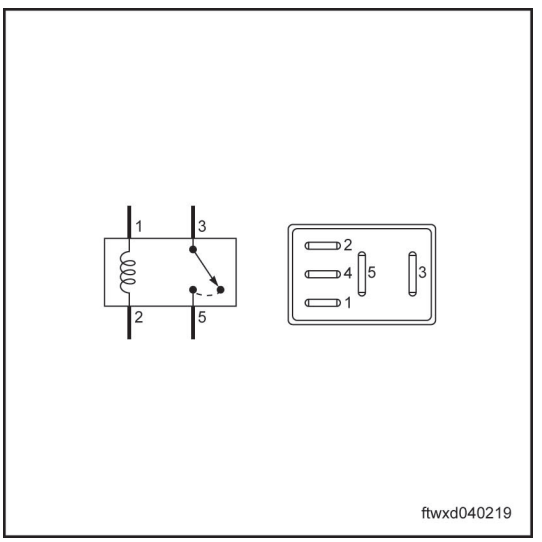
Yes> go to step 2

No > Replace the low beam bulbs.

2 . Check the relays of passing lamps

(a) Ignition Switch: OFF.

(b) Unplug the relay R2 of passing lamps.



(c) Check the front fog lamp relay R2.

Standard voltage

Conditions	Connecting pins of multimeter	Specified value
Normal situation	1 - 2	Breakover
Apply power supply voltage to position between stitches 1 and 2,	3 - 5	< 2 Ω

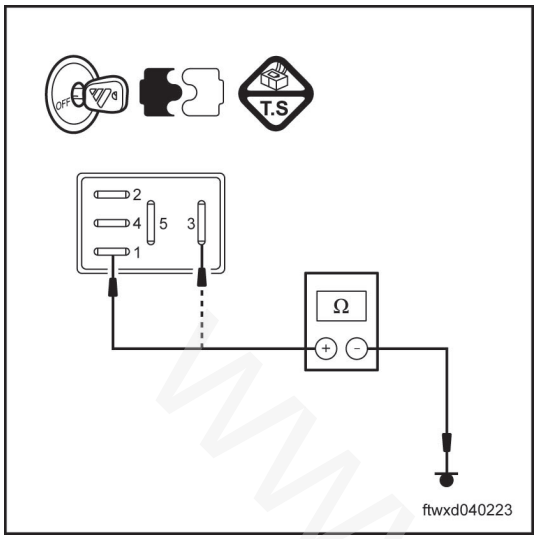
Check whether the result is normal?

Yes> go to step 3

No > Replace the relays of passing lamps.

3 . Check the harness and connectors (passing lamp relay - supply voltage)

(a) Ignition Switch: ON.
(b) Unplug the relay R2 of passing lamps.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R2 (1) - Ground	9-16V (battery voltage)
R2 (3) - Ground	9-16V (battery voltage)

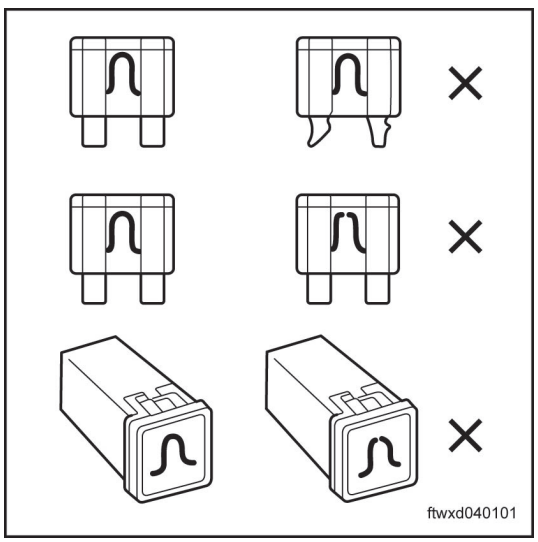
Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

4 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse inside the fuse box of engine compartment:

- F21（10A）
- F22（10A）

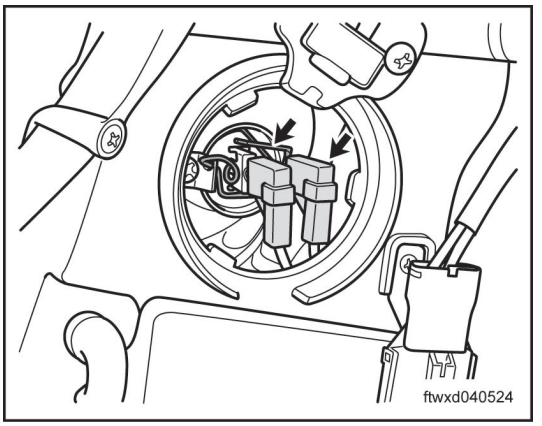
Check whether the result is normal?

Yes> go to step 5

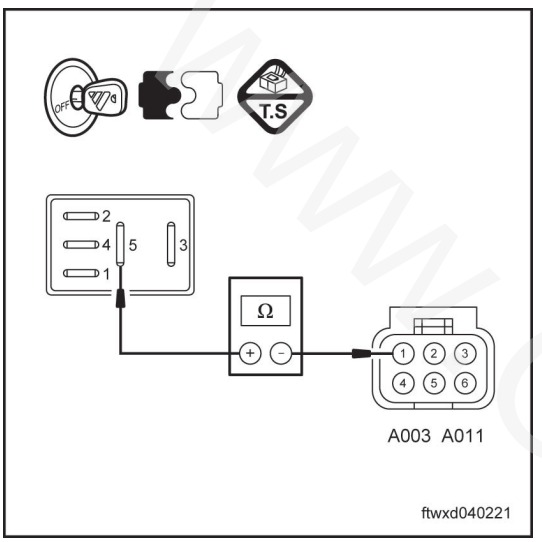
No> replace fuse

5 . Check the harness and connectors (passing lamp relay – passing lamps)

(a) Ignition Switch: OFF.
(b) Unplug the relay R2 of passing lamps.



(c) Disconnect the connector A011 of left front passing lamp.
(d) Disconnect the connector A003 of right front passing lamp.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R2（5）-A011（1）	＜2 Ω
R2（5）-A003（1）	

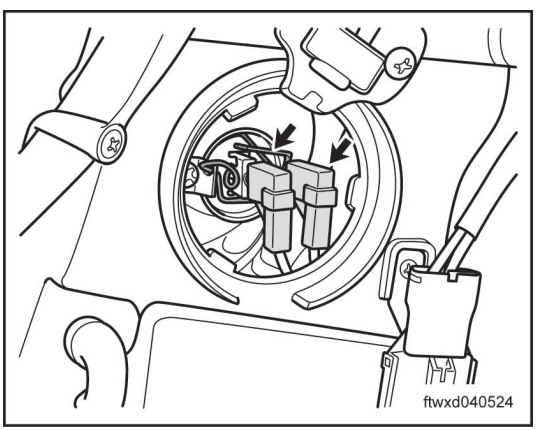
Check whether the result is normal?

Yes> go to step 6

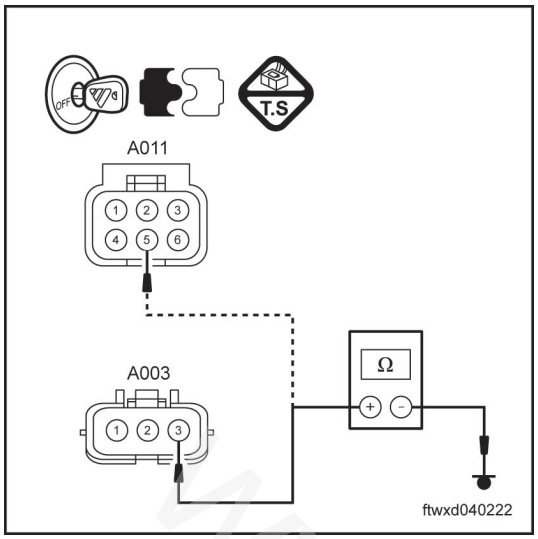
No > Maintenance or replace harness.

6 . Check the harness and connectors (passing lamp - ground)

(a) Ignition Switch: OFF.
(b) Unplug the relay R2 of passing lamps.



(c) Disconnect the connector A011 of left front passing lamp.
(d) Disconnect the connector A003 of right front passing lamp.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A011 (5) - ground	＜ 2 Ω
A003 (5) - ground	

Check whether the result is normal?

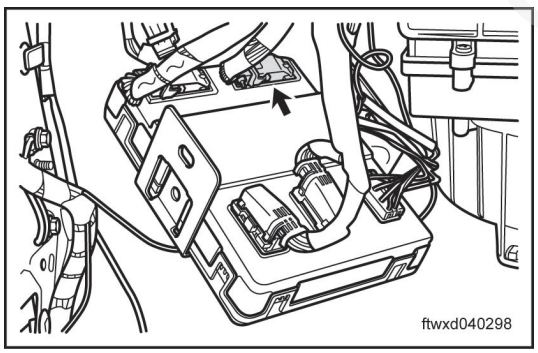
Yes> go to step 7

No > Maintenance or replace harness.

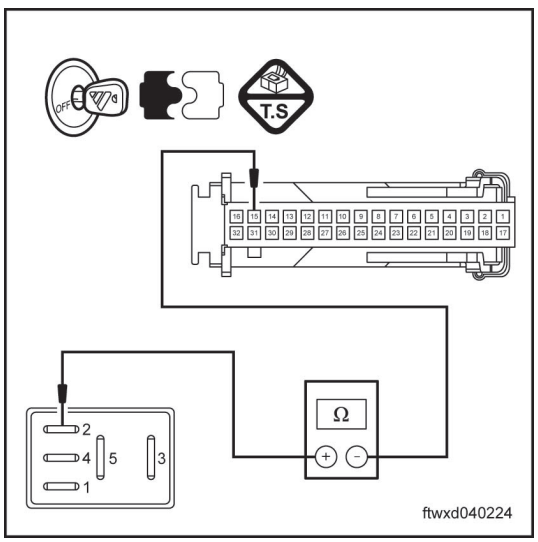
7 . Check the harness and connectors (passing lamp relay - BCM control unit)

(a) Ignition Switch: OFF.

(b) Unplug the fog lamp relay R2.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R2(2)-C035（D15）	＜ 2 Ω

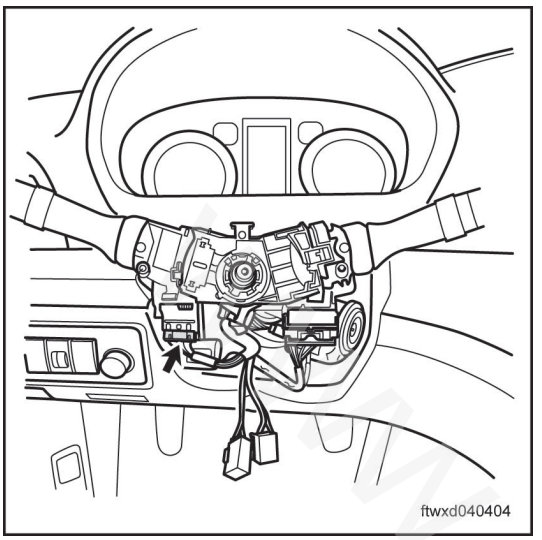
Check whether the result is normal?

Yes> go to step 8

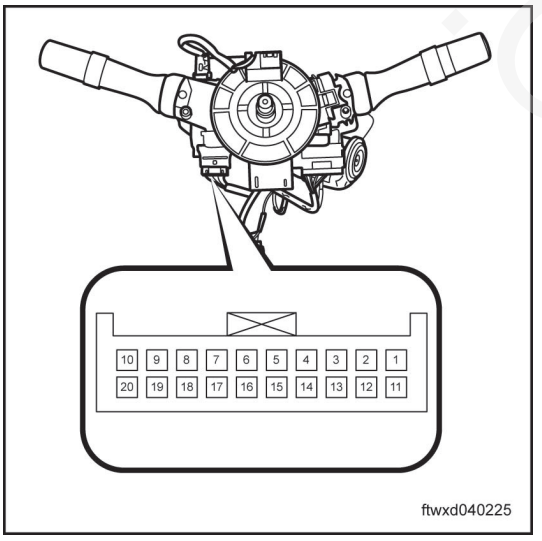
No > Maintenance or replace harness.

8 . Check the combination switch (lamplight switchover)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Check the combination switch (lamplight switchover)

Standard voltage

Conditions	Connecting pins of multimeter	Specified value
Turn off the passing lamp switch	11-13	⩾ 1 MΩ
Turn on the passing lamp switch	11-13	< 2 Ω

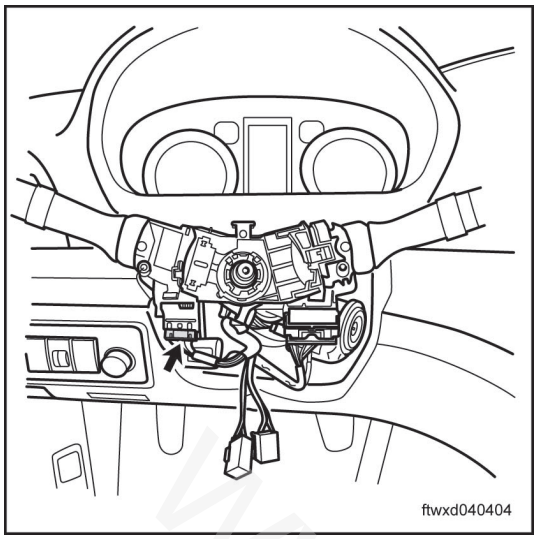
Check whether the result is normal?

Yes> go to step 9

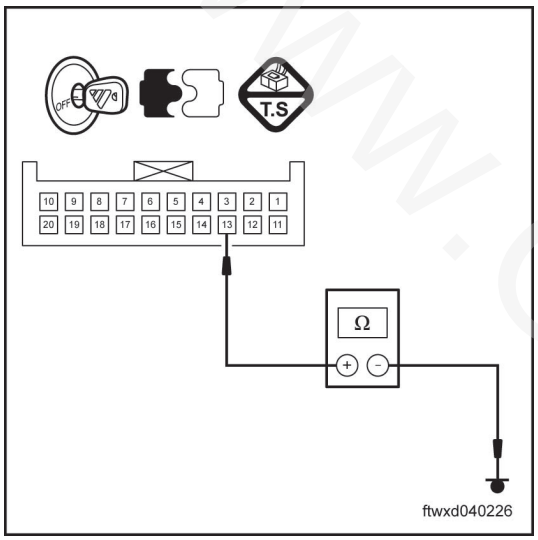
No > Replace the combination switch.

9 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C008 (13) - ground	< 2 Ω

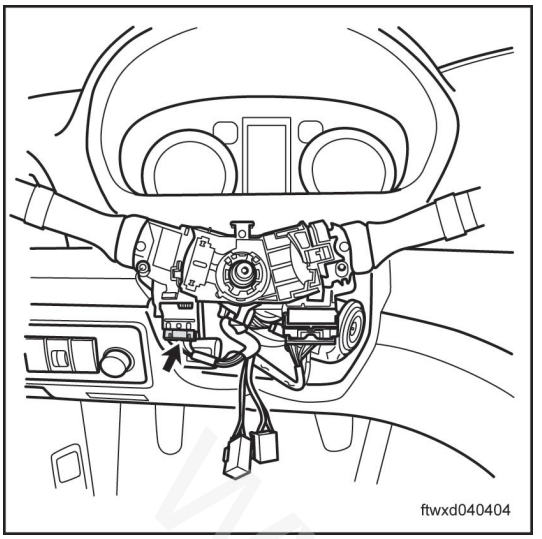
Check whether the result is normal?

Yes> go to step 10

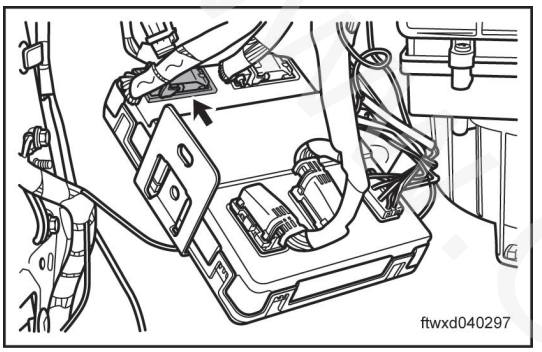
No > Maintenance or replace harness.

10 . Check the wiring harness and connectors (BCM controlling unit - combination switch)

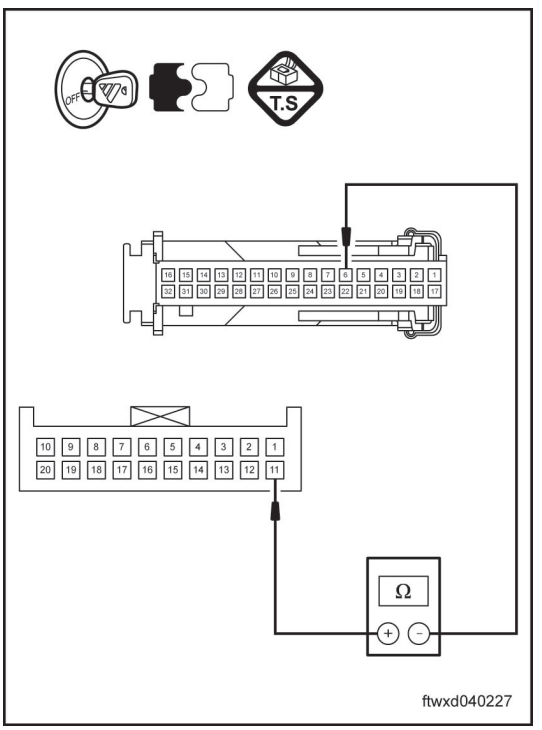
(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the resistance as per the values given in the table below

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C036(E6)-C008(11)	< 2 Ω

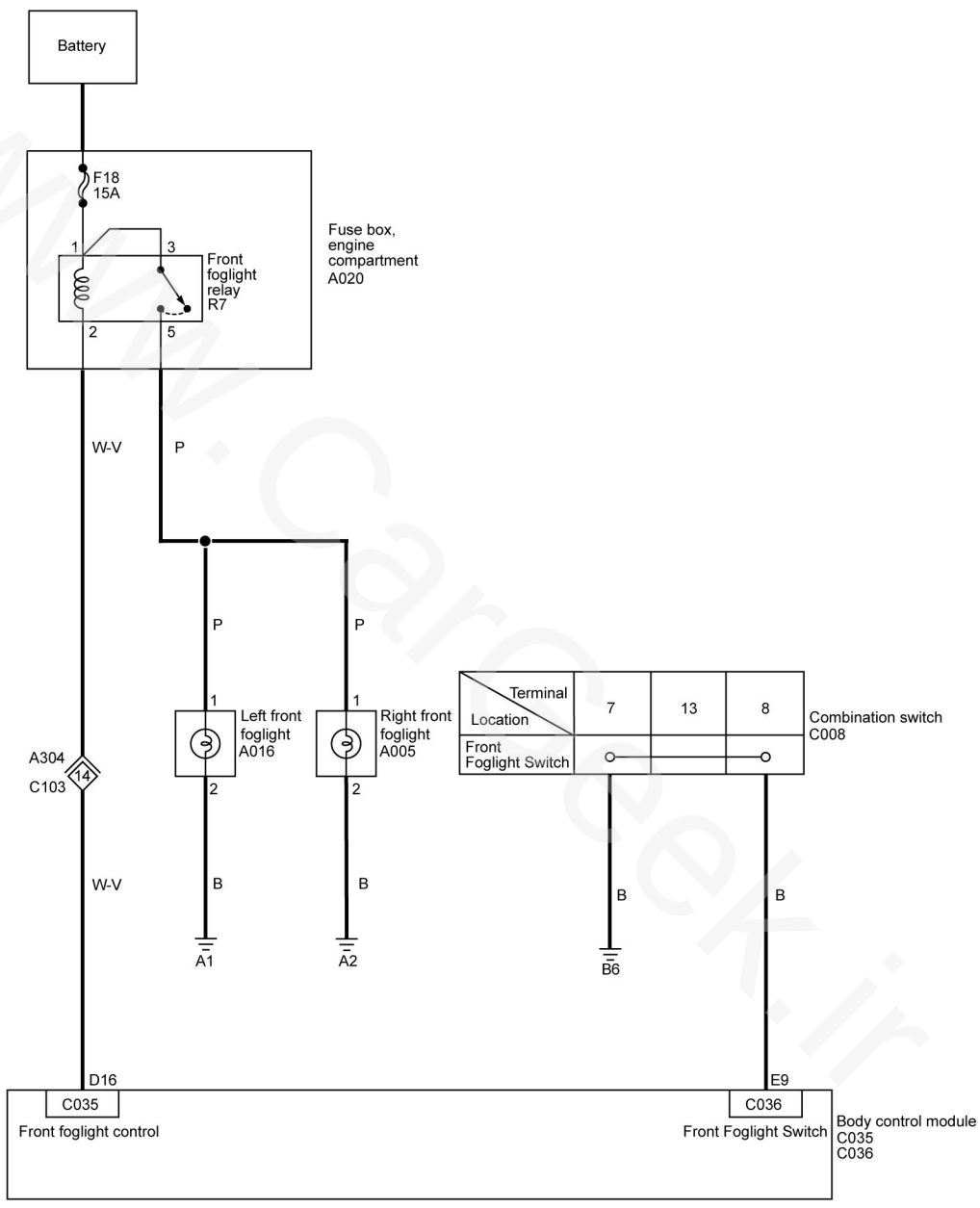
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1045OPEN CIRCUIT OF FRONT FOG LAMP CONTROL CIRCUIT
B1046HIGH CURRENT OF FRONT FOG LAMP CONTROL CIRCUIT

Circuit diagram

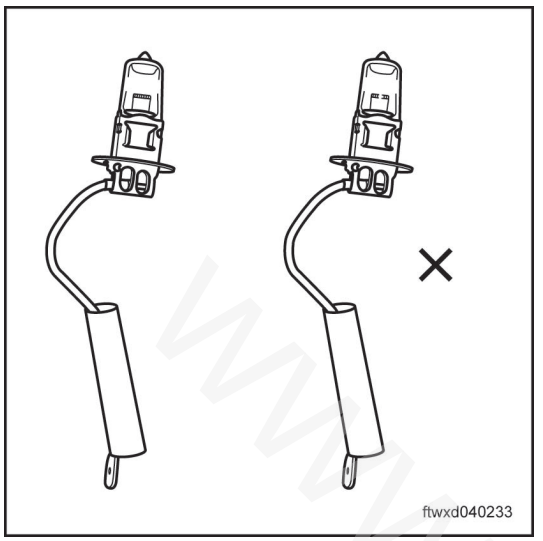


ftwxw710370

Diagnostic steps

1 . Check the front fog lamp bulb.

(a) Ignition Switch: OFF.



(b) Check whether or not the bulbs of front fog lamps are damaged.

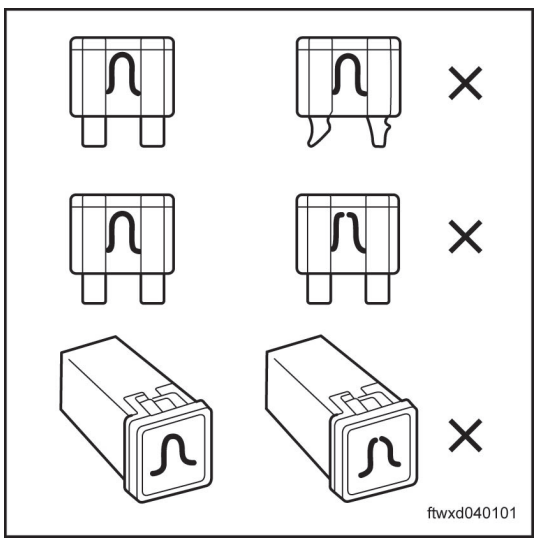
Check whether the result is normal?

Yes> go to step 2

No > Replace the front fog lamp bulb.

2 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F18 (15A) inside the fuse box of engine compartment.

Check whether the result is normal?

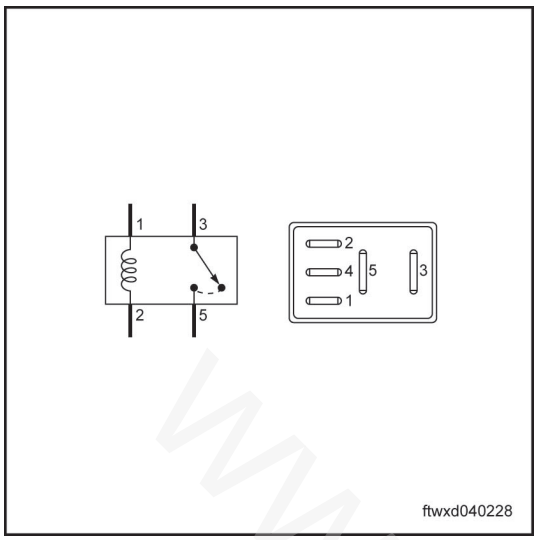
Yes> go to step 3

No> replace fuse

3 . Check the front fog lamp relay.

(a) Ignition Switch: OFF.

(b) Unplug the front fog lamp relay R7.



(c) Check the front fog lamp relay R7.

Standard voltage

Conditions	Connecting pins of multimeter	Specified value
Normal situation	1 – 2	Breakover
Apply power supply voltage to position between stitches 1 and 2,	3 – 5	< 2 Ω

Check whether the result is normal?

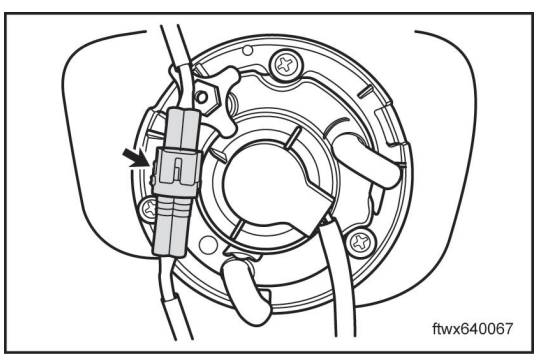
Yes> go to step 4

No > Replace the front fog lamp relay.

4 . Check the harness and connectors (front fog lamp relay – front fog lamp)

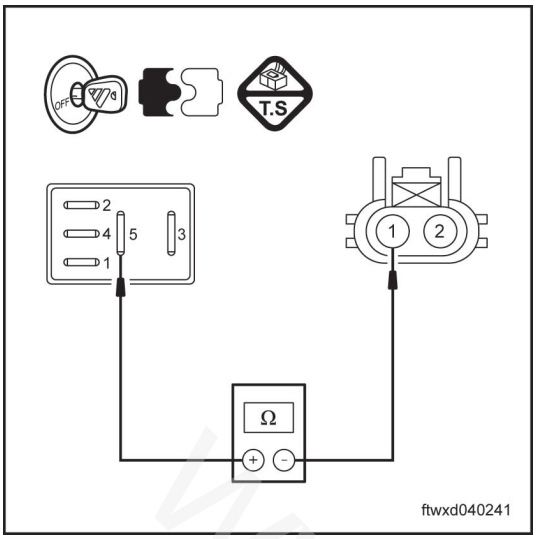
(a) Ignition Switch: OFF.

(b) Unplug the front fog lamp relay R7.



(c) Disconnect the left front fog lamp connector A016.

(d) Disconnect the right front fog lamp connector A005.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R7（5）-A016（1）	＜2 Ω
R7（5）-A005（1）	

Check whether the result is normal?

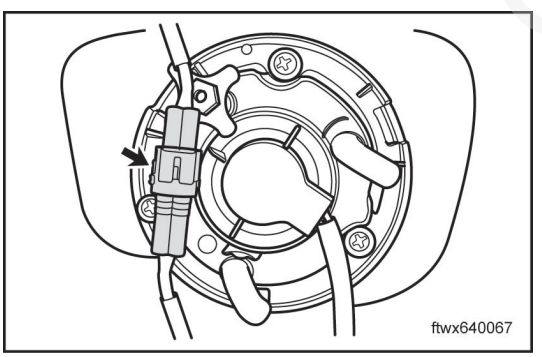
Yes> go to step 5

No > Maintain or replace the harness

5 . Check the harness and connectors (front fog lamp - ground)

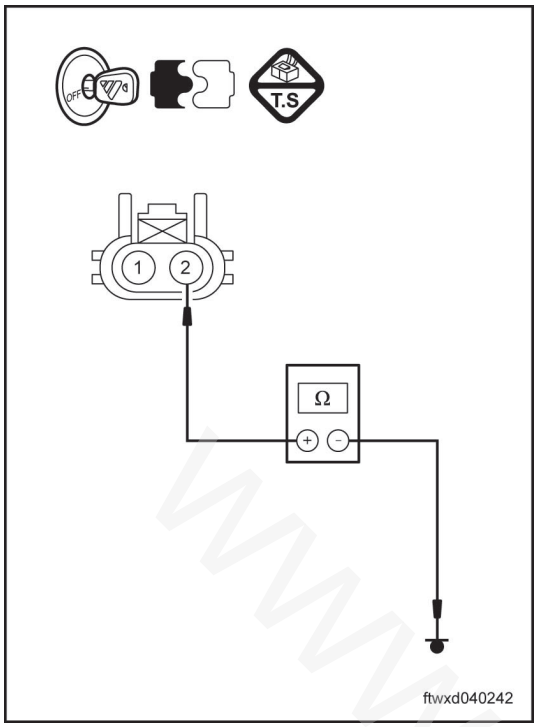
(a) Ignition Switch: OFF.

(b) Unplug the front fog lamp relay R7.



(c) Disconnect the left front fog lamp connector A016.

(d) Disconnect the right front fog lamp connector A005.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A016 (2) - ground	< 2 Ω
A005 (2) - ground	

04

Check whether the result is normal?

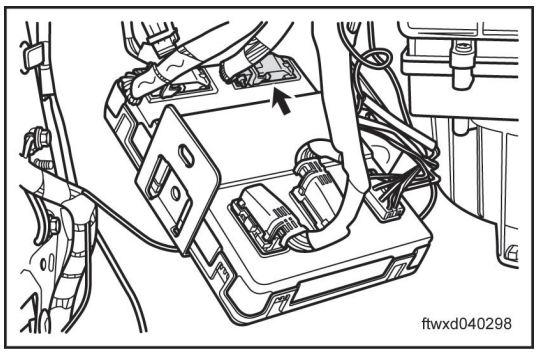
Yes> go to step 6

No > Maintain or replace the harness

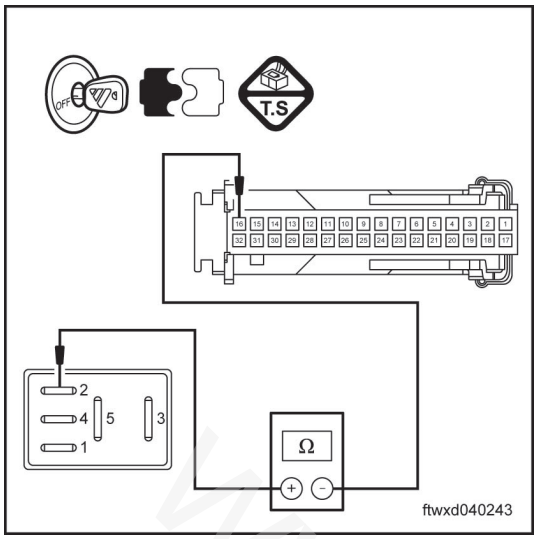
6 . Check the harness and connectors (fog lamp relay - BCM control unit)

(a) Ignition Switch: OFF.

(b) Unplug the fog lamp relay R7.



(c) Disconnect connector C035, BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
R7（2）- C035（D16）	＜ 2 Ω

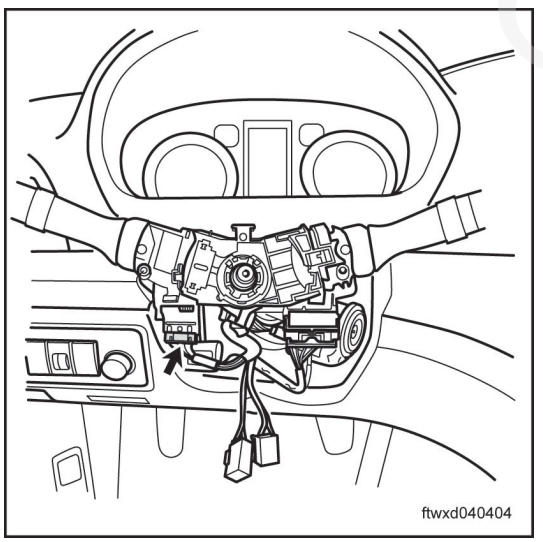
Check whether the result is normal?

Yes> go to step 7

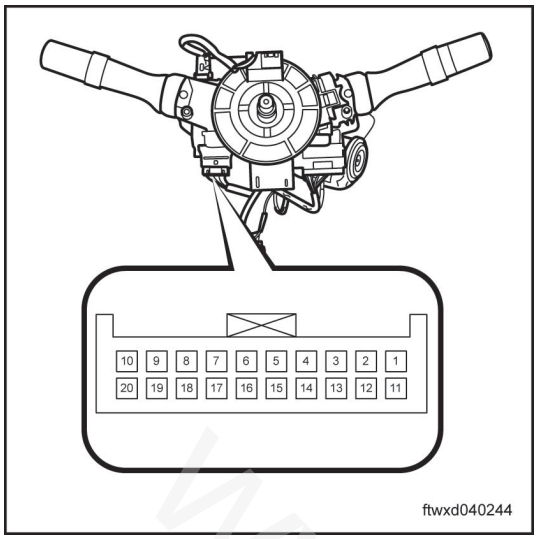
No > Maintain or replace the harness

7 . Check the combination switch (lamplight switchover)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Check the combination switch (lamplight switchover)

Standard voltage

Conditions	Connecting pins of multimeter	Specified value
Turn off the fog lamp switch	7-8	⩾ 1 MΩ
Turn on the fog lamp switch	7-8	＜ 2 Ω

04

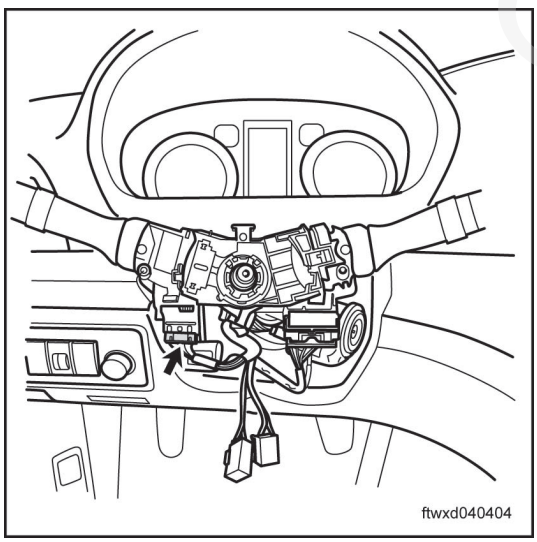
Check whether the result is normal?

Yes> go to step 8

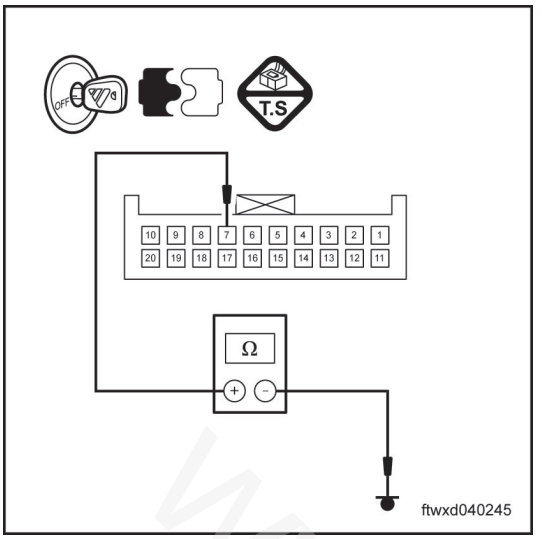
No > Replace the combination switch.

8 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C008 (7) - ground	< 2 Ω

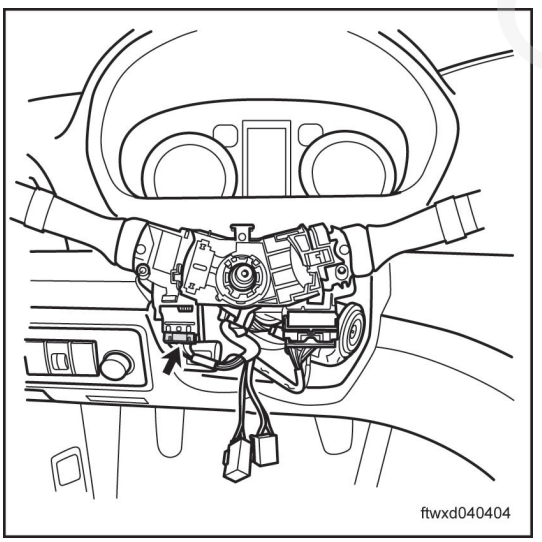
Check whether the result is normal?

Yes> go to step 9

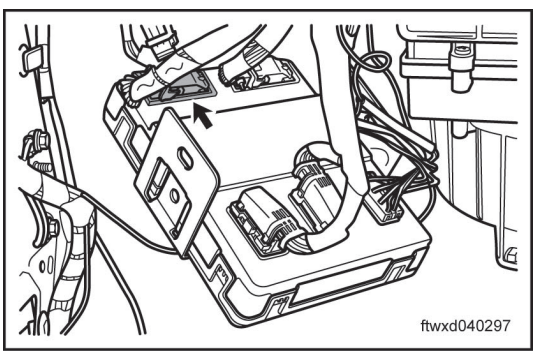
No > Maintenance or replace harness.

9 . Check the wiring harness and connectors (BCM controlling unit - combination switch)

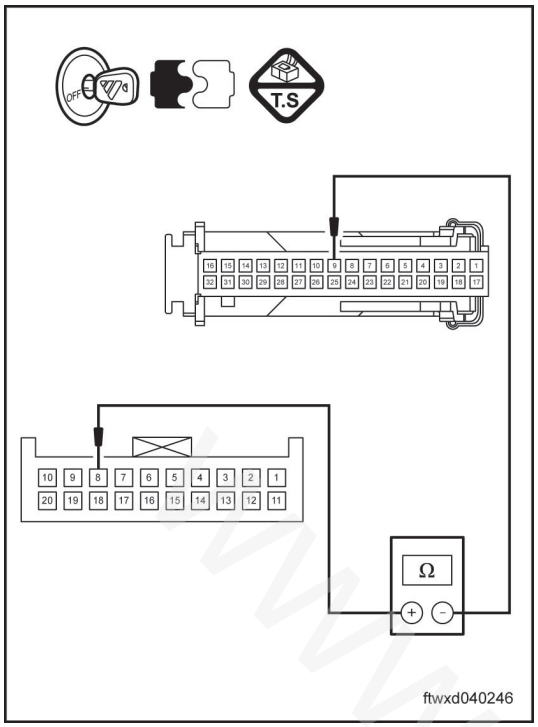
(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C036（E9）-C008（8）	＜2 Ω

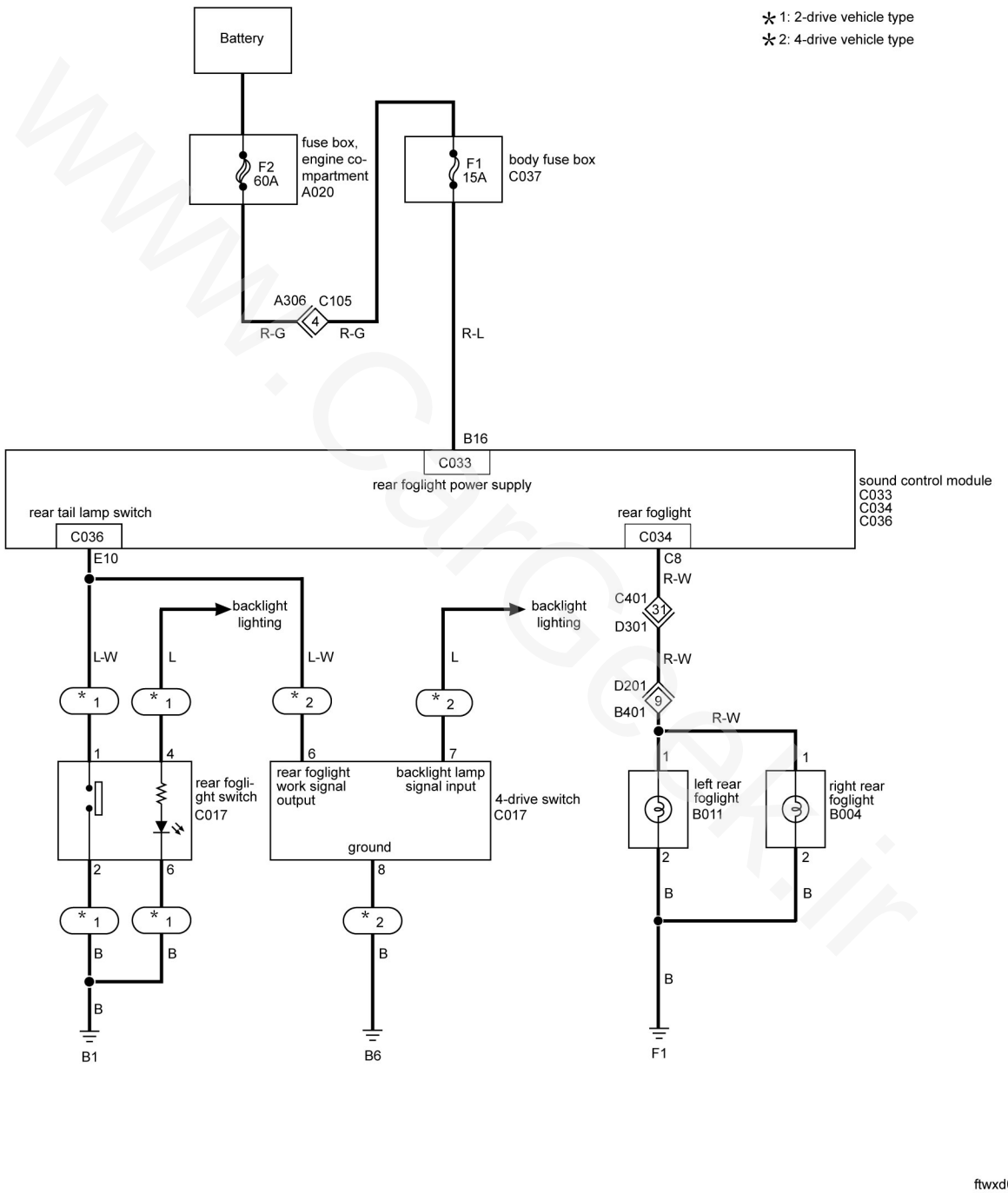
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1048OPEN CIRCUIT OF REAR FOG LAMP CONTROL CIRCUI
B1049LOW CURRENT OF REAR FOG LAMP CONTROL CIRCUIT
B1050 HIGH CURRENT OF REAR FOG LAMP CONTROL CIRCUIT

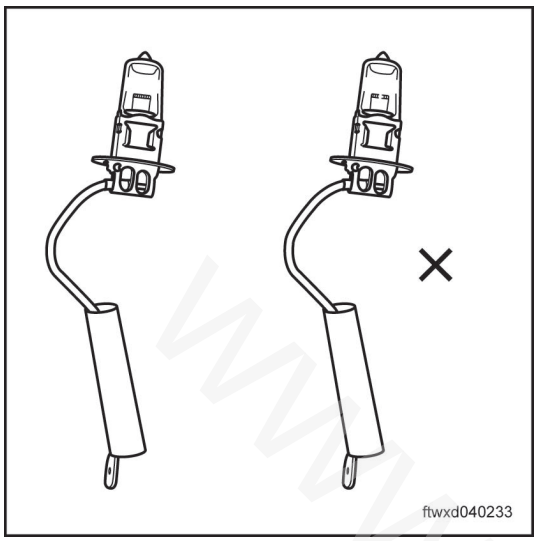
Circuit diagram



Diagnostic steps

1 . Check the rear fog lamp bulb.

(a) Ignition Switch: OFF.



(b) Check whether or not the bulbs of rear fog lamps are damaged.

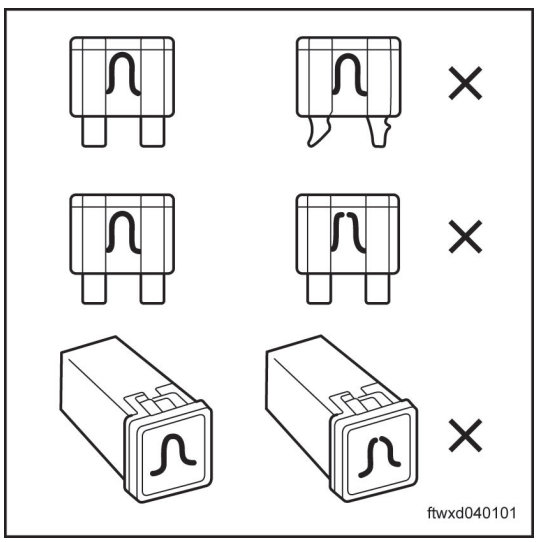
Check whether the result is normal?

Yes> go to step 2

No > Replace the rear fog lamp bulbs.

2 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F1 (15A) in the indoor fuse box.

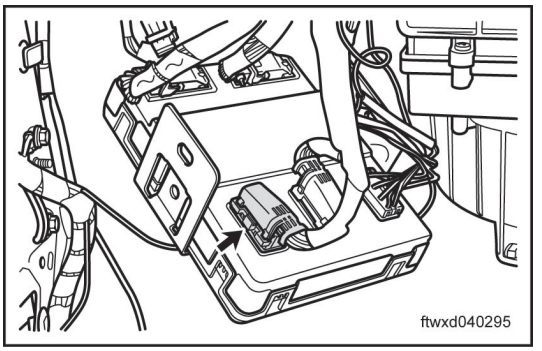
Check whether the result is normal?

Yes> go to step 3

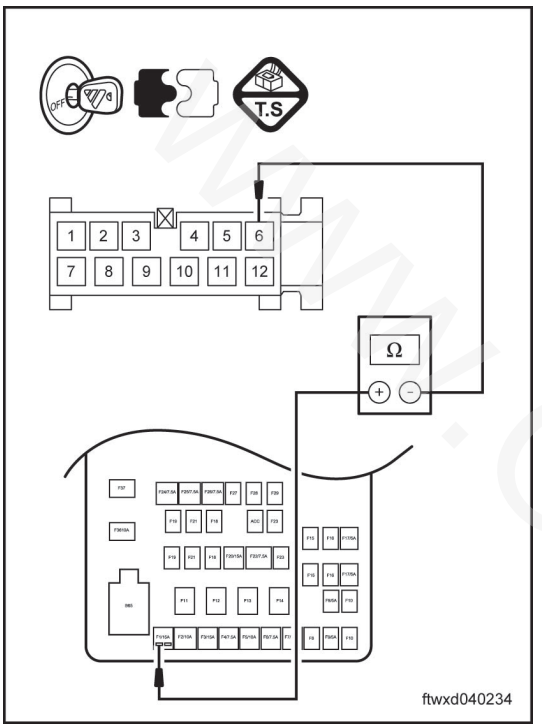
No> replace fuse

3 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect connector C033 , BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F1(15A)-C033（B6）	＜ 2 Ω

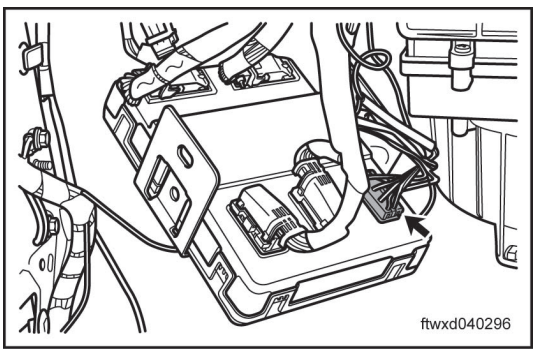
Check whether the result is normal?

Yes> go to step 4

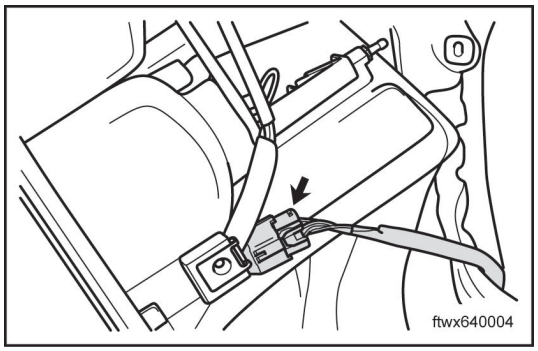
No > Maintenance or replace harness.

4 . Check the harness and connector (BCM control unit - rear fog lamp)

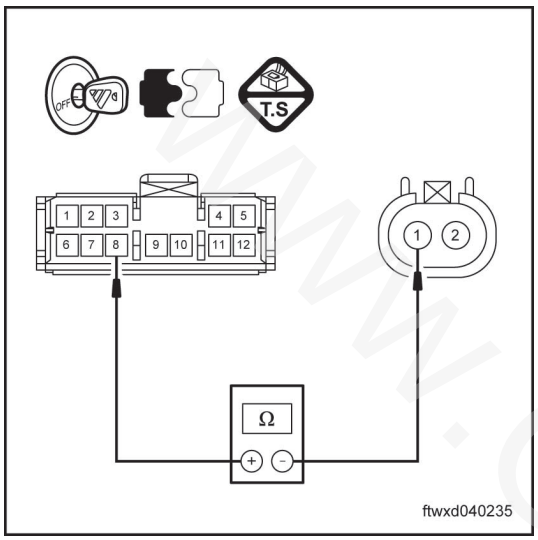
(a) Ignition Switch: OFF.



(b) Disconnect the connector C034 of BCM control unit.



(c) Disconnect the left rear fog lamp connector B011.
(d) Disconnect the right rear fog lamp connector B004.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C034(C8) - B011(1)	< 2 Ω
C034(C8) - B004(1)	

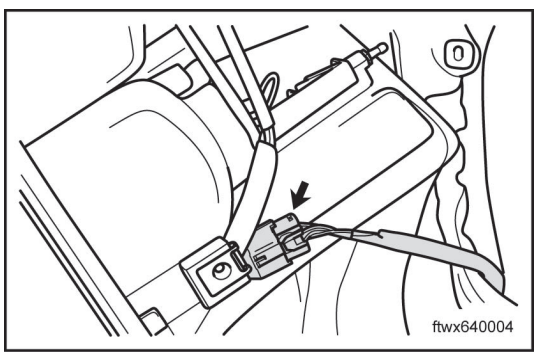
Check whether the result is normal?

Yes> go to step 5

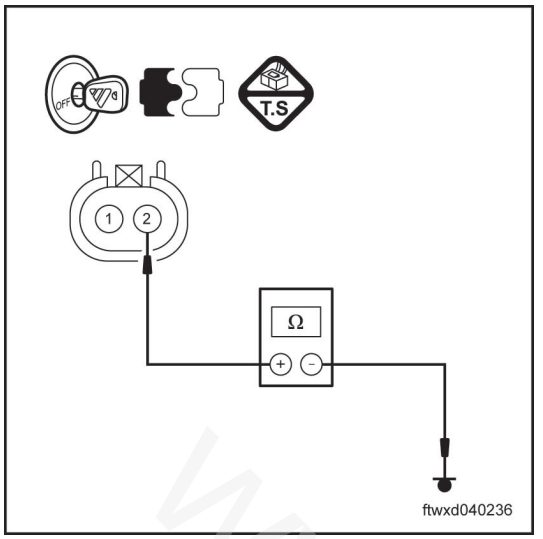
No > Maintenance or replace harness.

5 . Check the harness and connectors (rear fog lamp - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the left rear fog lamp connector B011.
(c) Disconnect the right rear fog lamp connector B004.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
B011 (2) - ground	< 2 Ω
B004 (2) - ground	

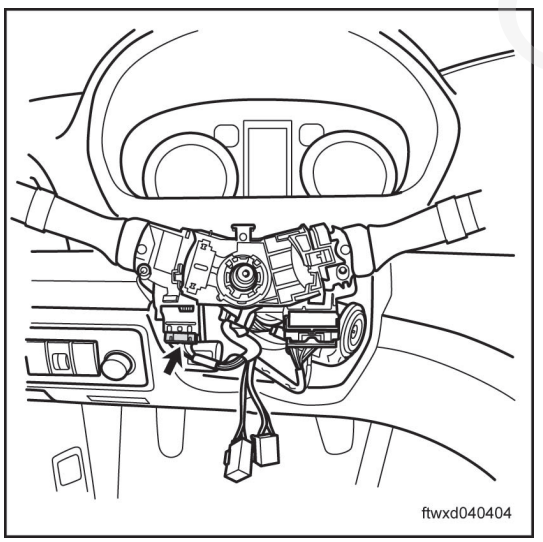
Check whether the result is normal?

Yes> go to step 6

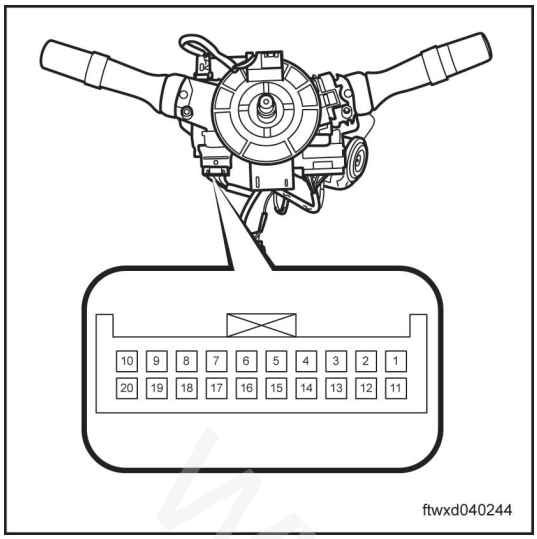
No > Maintenance or replace harness.

6 . Check the rear fog lamp switch

(a) Ignition Switch: OFF.



(b) Disconnect the rear fog lamp switch connector C017.



(c) Check the rear fog lamp switch

Standard electrical resistance (check whether there existent an open circuit)

Conditions	Connecting pins of multimeter	Specified value
Turn off the front fog lamp switch	1-2	⩾ 1 MΩ
Turn on the rear fog lamp switch	1-2	＜ 2 Ω

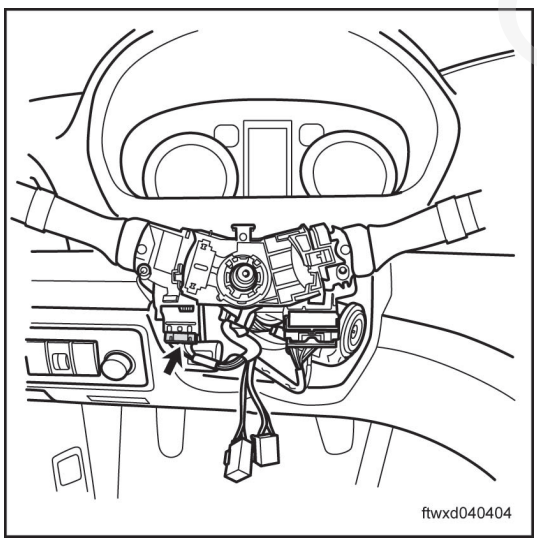
Check whether the result is normal?

Yes> go to step 7

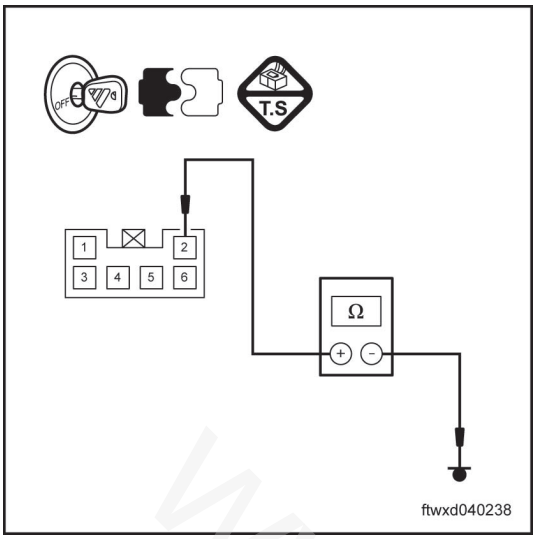
No > Replace the rear fog lamp switch.

7 . Check the harness and connectors (rear fog lamp switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the rear fog lamp switch connector C017.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C017 (2) - ground	< 2 Ω

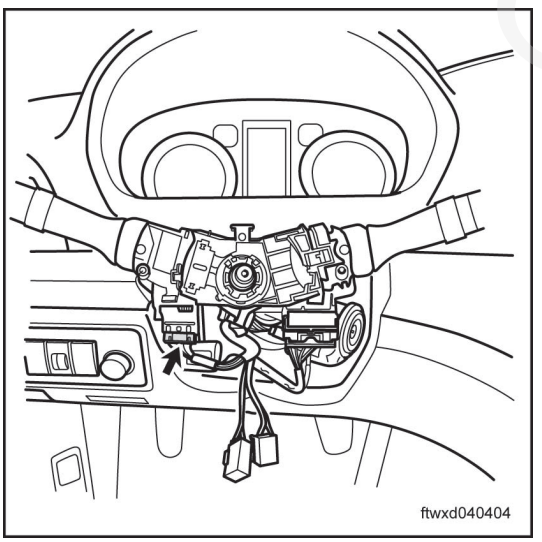
Check whether the result is normal?

Yes> go to step 8

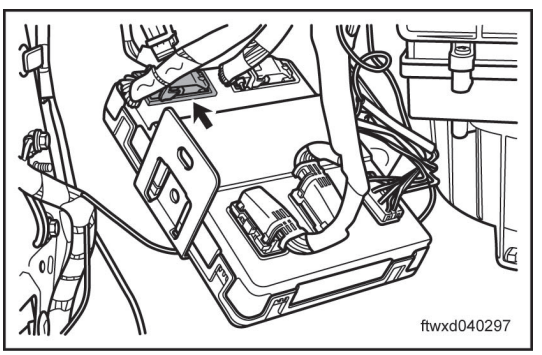
No > Maintenance or replace harness.

8 . Check the harness and connectors (rear fog lamp switch - BCM control unit)

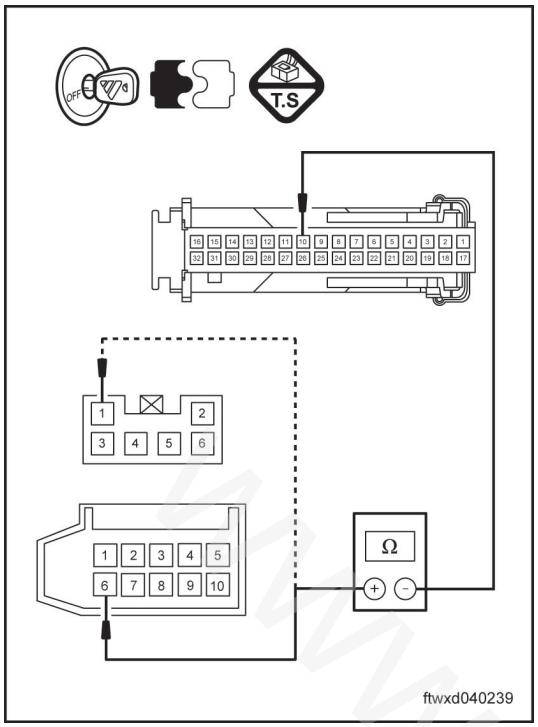
(a) Ignition Switch: OFF.



(b) Disconnect the rear fog lamp switch connector C017.



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
2- drive: C017(1)-C036（E10）	＜2 Ω
4- drive: C017(6)-C036（E10）	

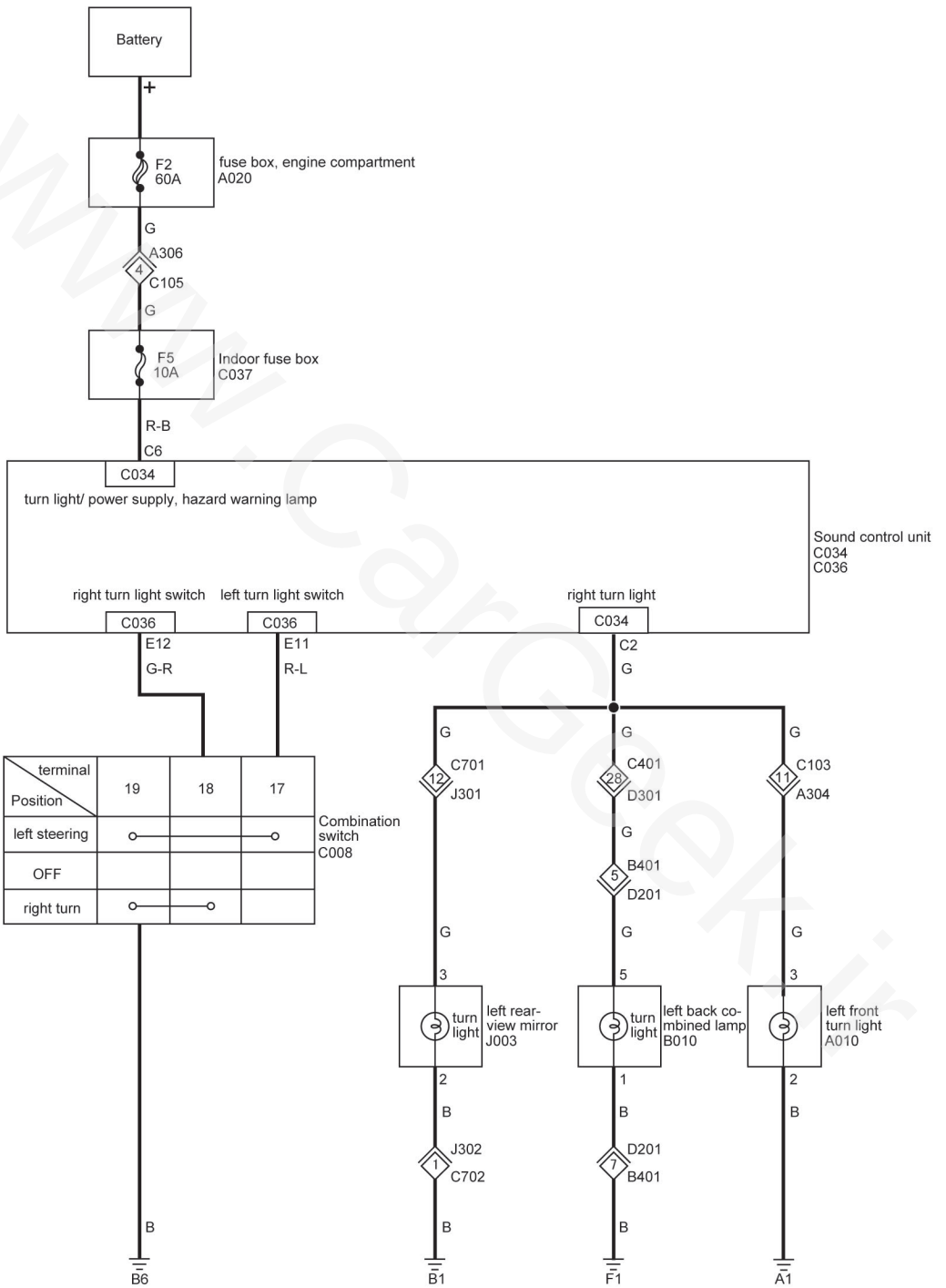
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1001 LOW CURRENT OF LEFT TURN LIGHT CONTROL CIRCUIT B1002TO-GROUND SHORT-CIRCUIT OF LEFT TURN LIGHT CONTROL CIRCUIT

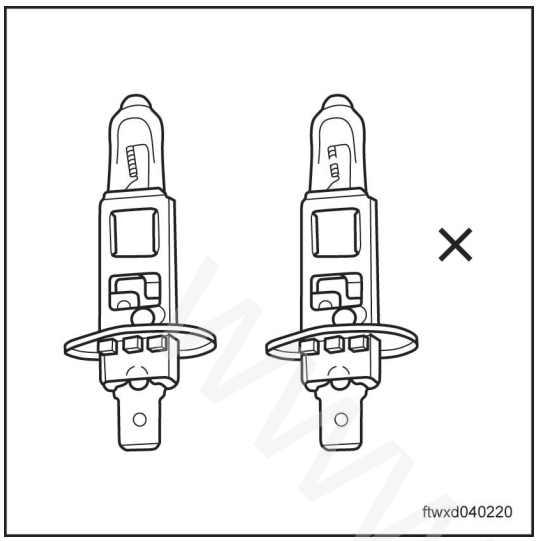
Circuit diagram



Diagnostic steps

1 . Check the left turn light bulb

(a) Ignition Switch: OFF.



(b) Check whether or not the bulb of left turn light is damaged.

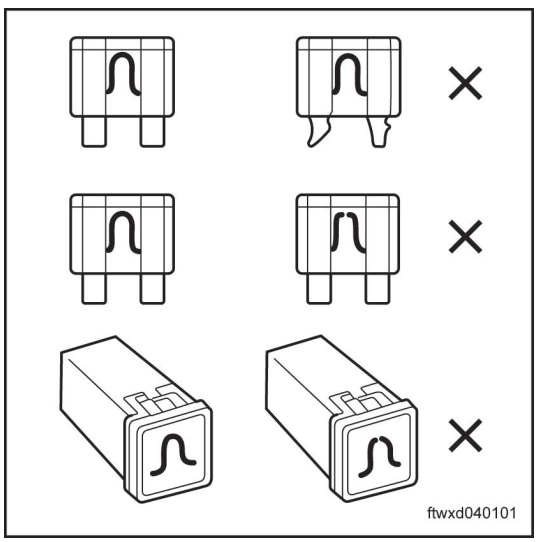
Check whether the result is normal?

Yes> go to step 2

No > Replace the bulb of left turn light.

2 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F5 (10A) in the indoor fuse box.

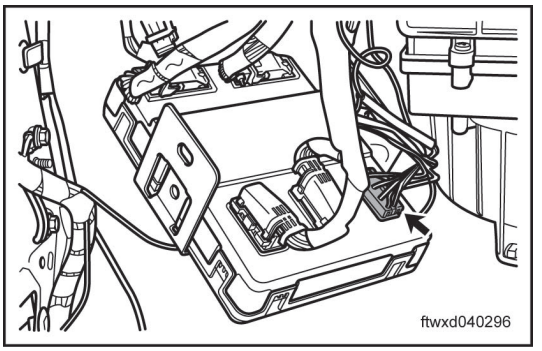
Check whether the result is normal?

Yes> go to step 3

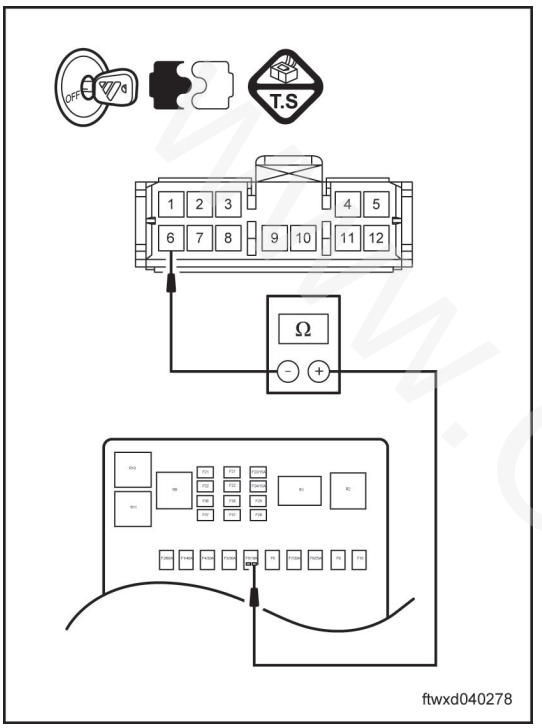
No> replace fuse

3 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C034 of BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F5（10A）- C034（C6）	＜ 2 Ω

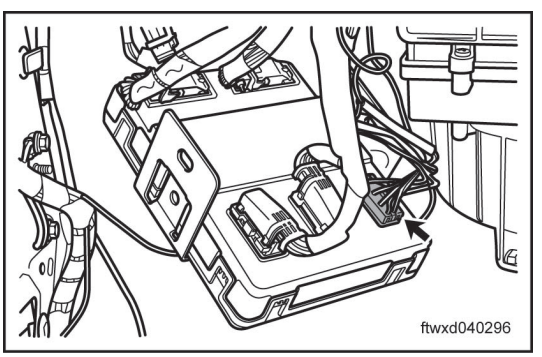
Check whether the result is normal?

Yes> go to step 4

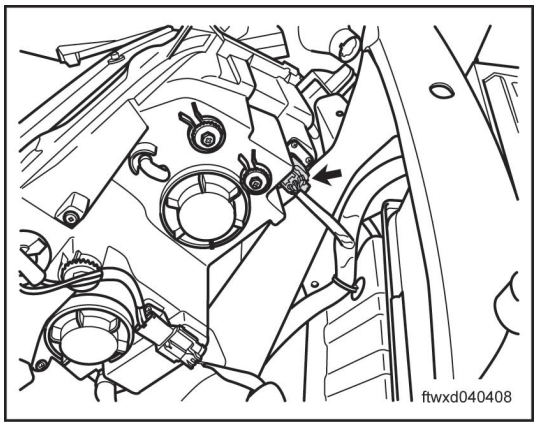
No > Maintenance or replace harness.

4 . Check the harness and connector (BCM control unit – left turn light)

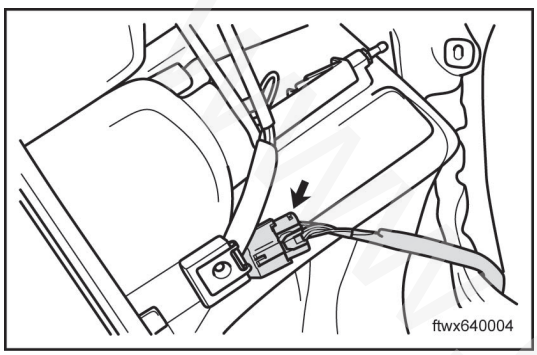
(a) Ignition Switch: OFF.



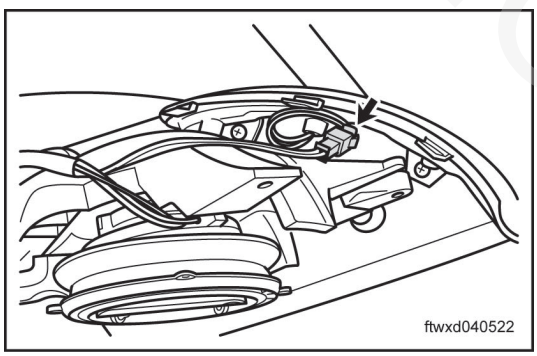
(b) Disconnect the connector C034 of BCM control unit.



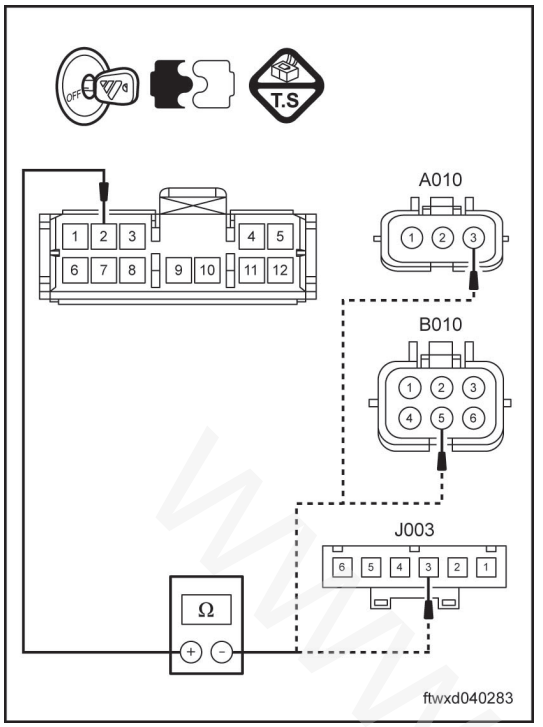
(c) Disconnect the left front turn light connector A010.



(d) Disconnect the left rear turn light connector B010.



(e) Disconnect the left rear-view mirror connector J003.



(f) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C034（C2）- A010（3）	＜ 2 Ω
C034（C2）- B010（5）	
C034（C2）- J003（3）	

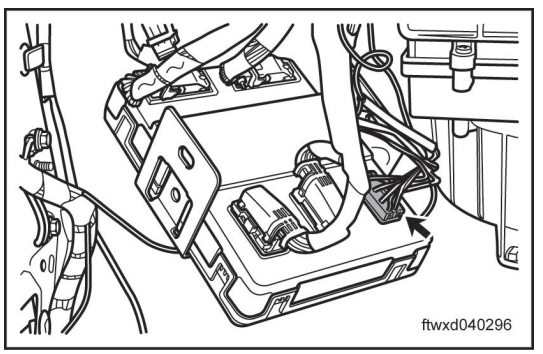
Check whether the result is normal?

Yes> go to step 5

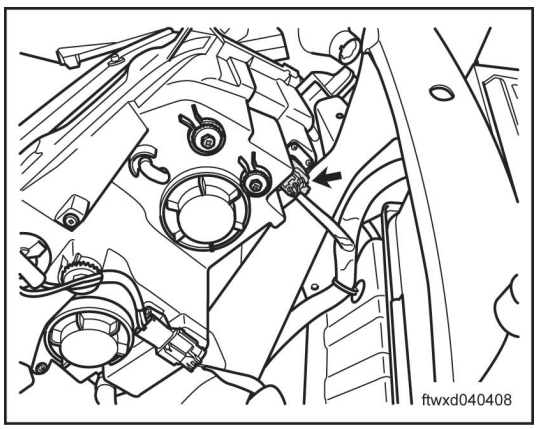
No > Maintenance or replace harness.

5 . Check the harness and connectors (left turn light - ground)

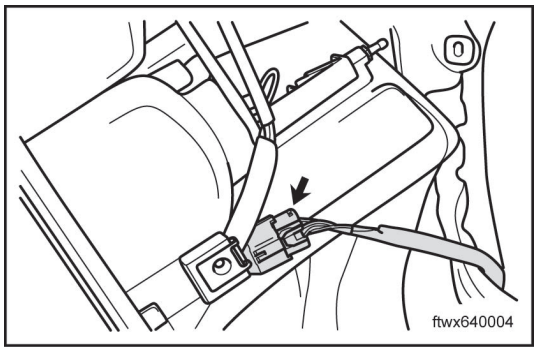
(a) Ignition Switch: OFF.



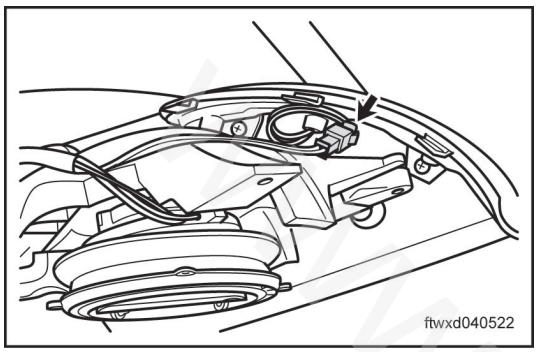
(b) Disconnect the connector C034 of BCM control unit.



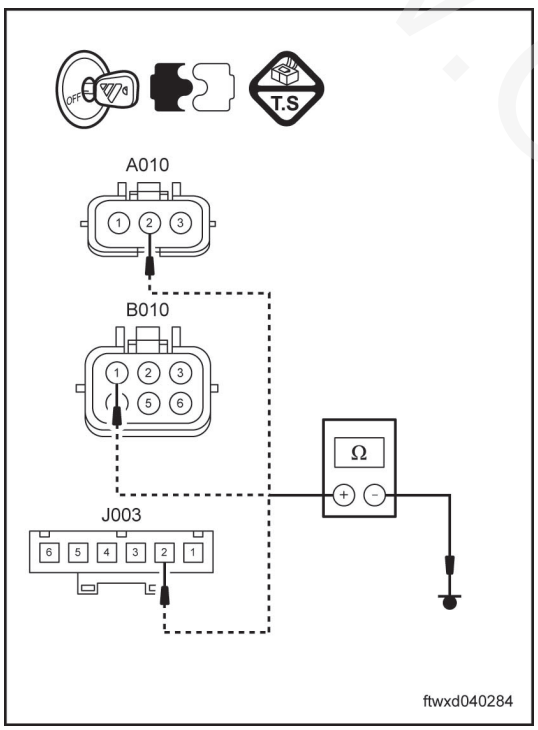
(c) Disconnect the left front turn light connector A010.



(d) Disconnect the left rear turn light connector B010.



(e) Disconnect the left rear-view mirror connector J003.



(f) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A010 (2) - ground	< 2 Ω
B010 (1) - Ground	
J003 (2) - ground	

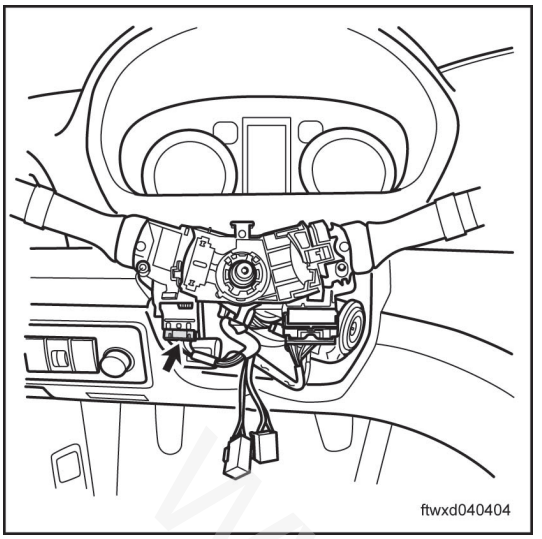
Check whether the result is normal?

Yes> go to step 6

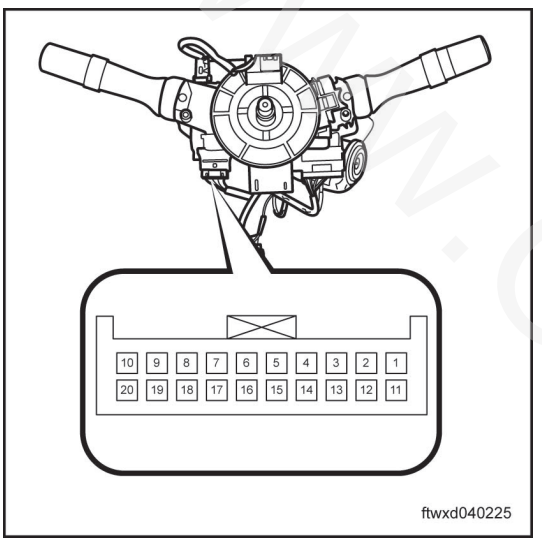
No > Maintenance or replace harness.

6 . Check the combination switch (lamplight switchover)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Check the combination switch (lamplight switchover)

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Turn off the left turn switch	17-19	$\geqslant$ 1 MΩ
Turn on the left turn switch	17-19	$<$ 2 Ω

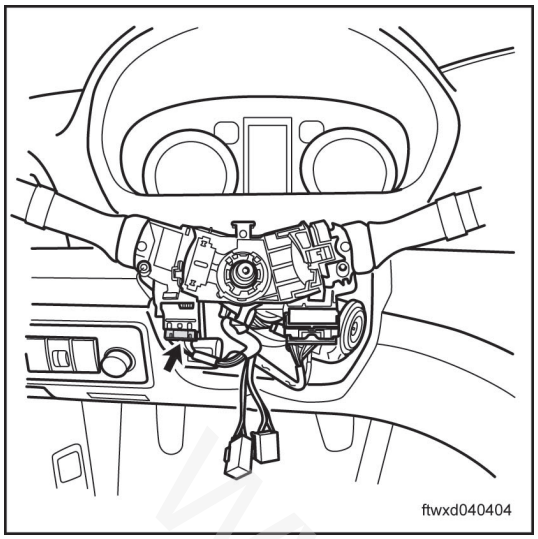
Check whether the result is normal?

Yes> go to step 7

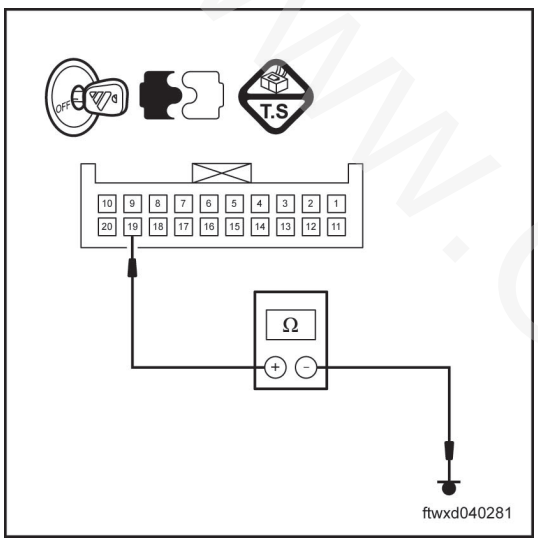
No > Replace the combination switch.

7 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C008 (19) - ground	< 2 Ω

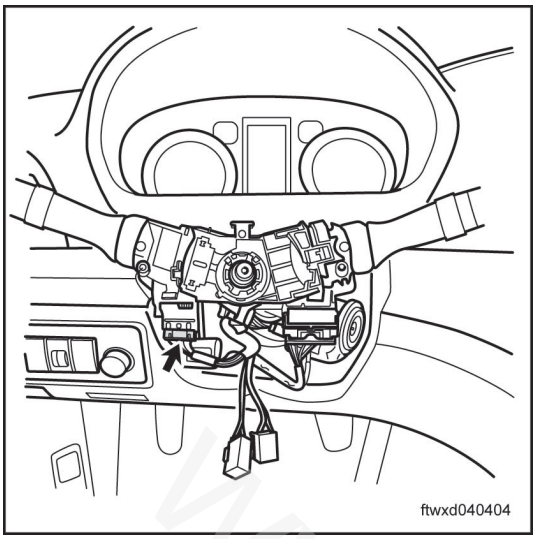
Check whether the result is normal?

Yes> go to step 8

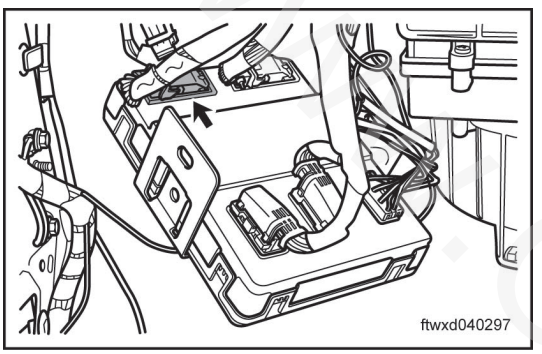
No > Maintenance or replace harness.

8 . Check the wiring harness and connectors (BCM controlling unit - combination switch)

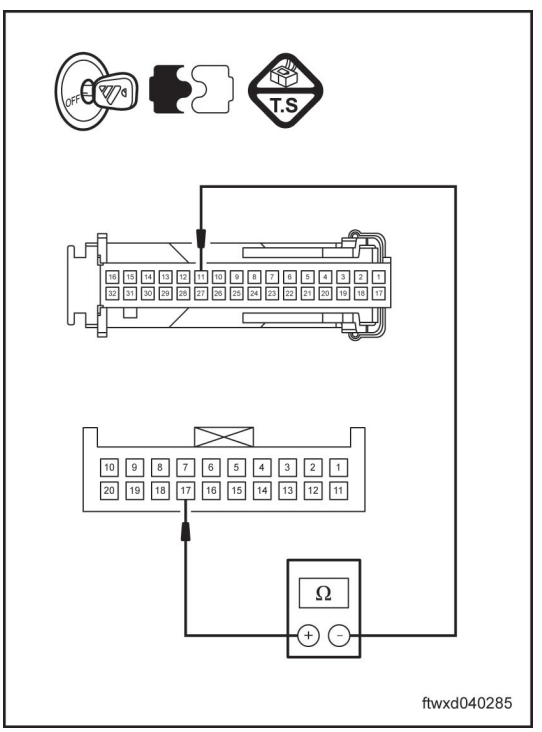
(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C036（E11） - C008（17）	＜2 Ω

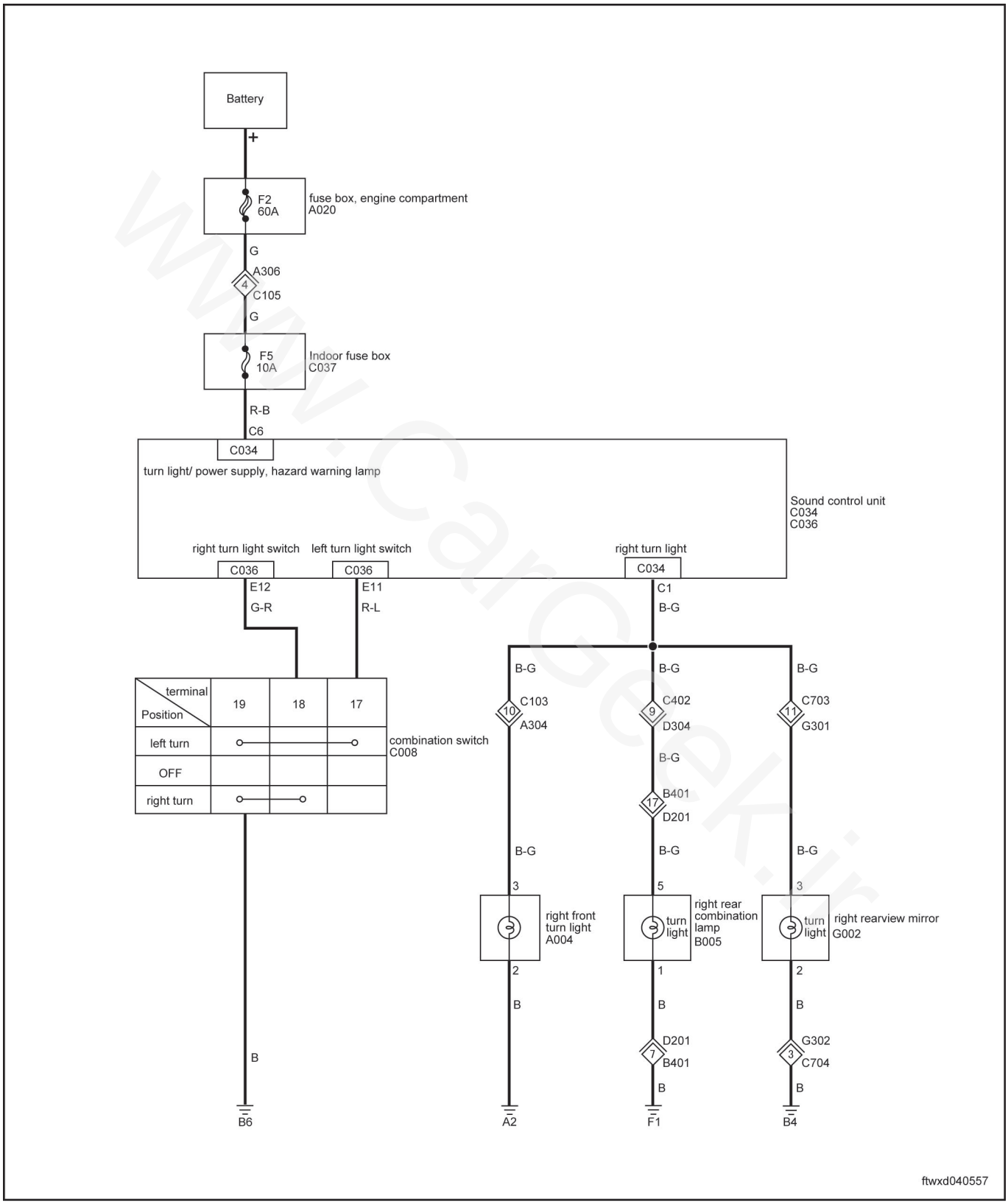
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1004 LOW CURRENT OF RIGHT TURN LIGHT CONTROL CIRCUIT B1005TO-GROUND SHORT-CIRCUIT OF RIGHT TURN LIGHT CONTROL CIRCUIT

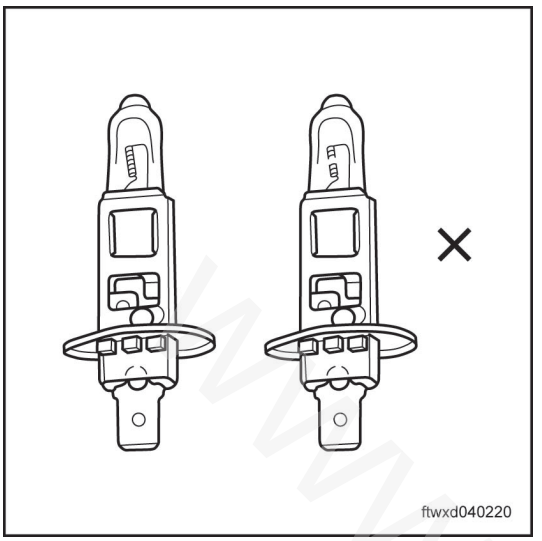
Circuit diagram



Diagnostic steps

1 . Check the right turn light bulb

(a) Ignition Switch: OFF.



(b) Check whether or not the bulb of right turn light is damaged.

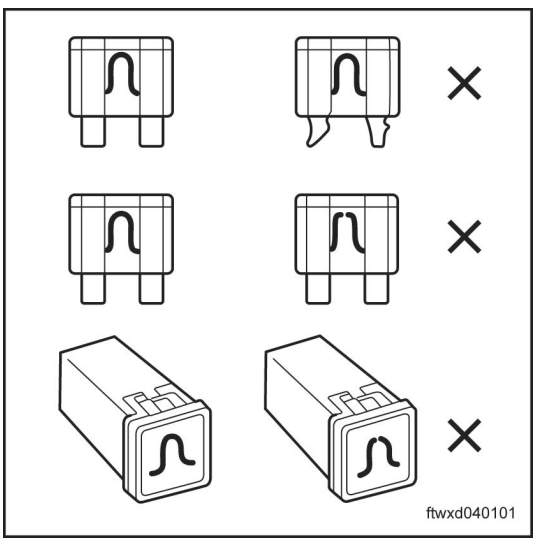
Check whether the result is normal?

Yes> go to step 2

No > Replace the bulb of right turn light.

2 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F5 (10A) in the indoor fuse box.

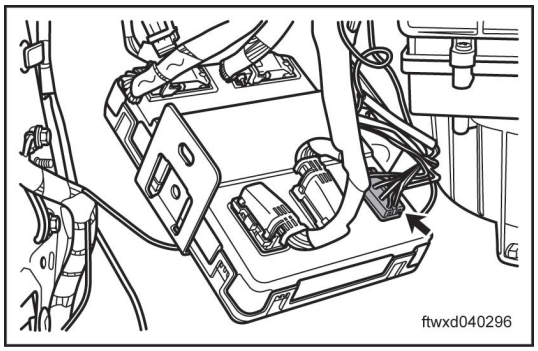
Check whether the result is normal?

Yes> go to step 3

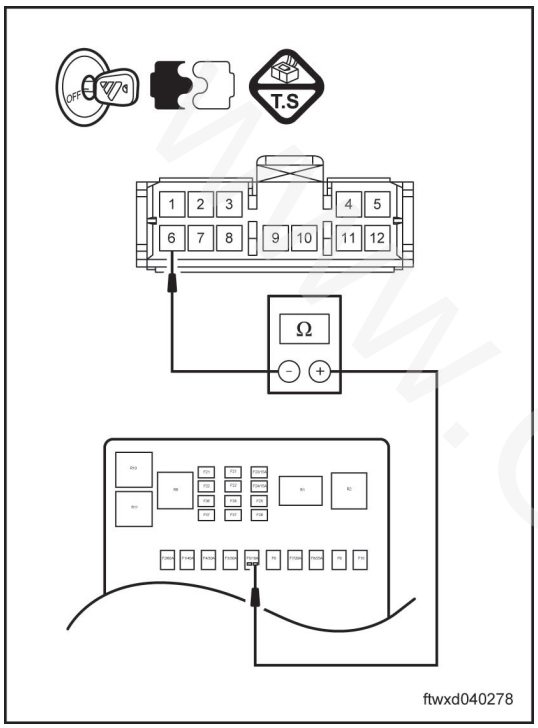
No> replace fuse

3 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C034 of BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F5(10A) - C034（C6）	＜ 2 Ω

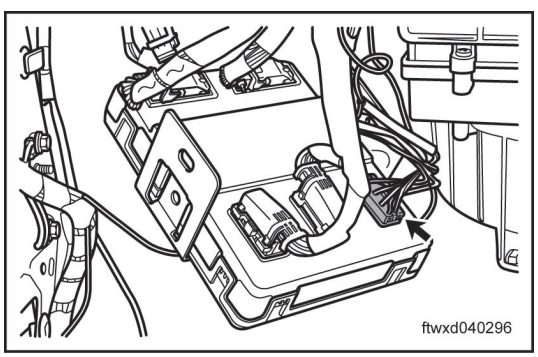
Check whether the result is normal?

Yes> go to step 4

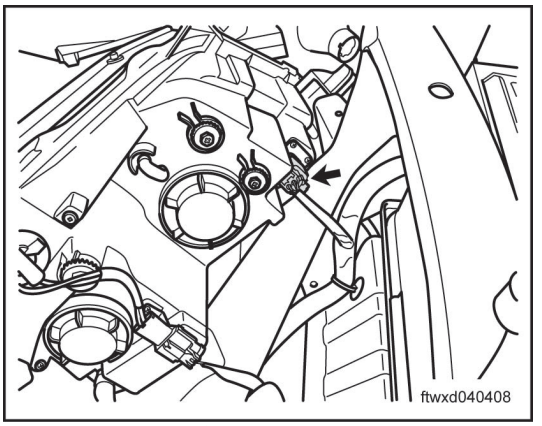
No > Maintenance or replace harness.

4 . Check the harness and connector (BCM control unit – right turn light)

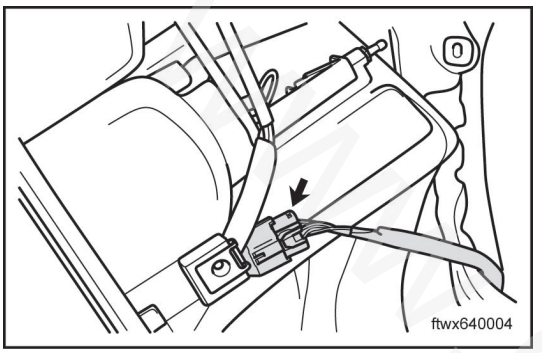
(a) Ignition Switch: OFF.



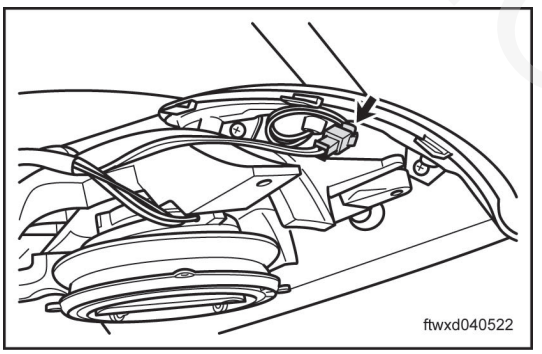
(b) Disconnect the connector C034 of BCM control unit.



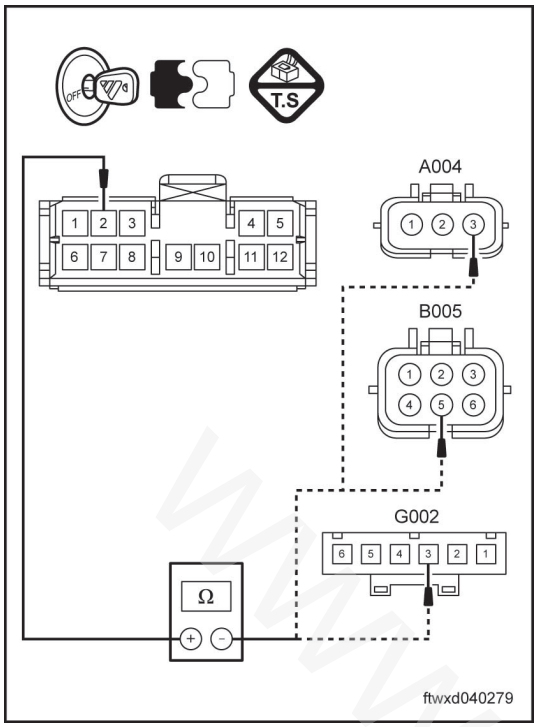
(c) Disconnect the right front turn light connector A004.



(d) Disconnect the right rear turn light connector B005.



(e) Disconnect the left rear-view mirror connector G002.



(f) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C034（C1）- A004（3）	＜ 2 Ω
C034（C1）- B005（5）	
C034（C1）- G002（3）	

04

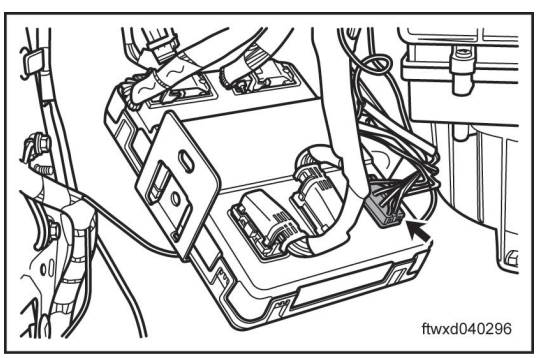
Check whether the result is normal?

Yes> go to step 5

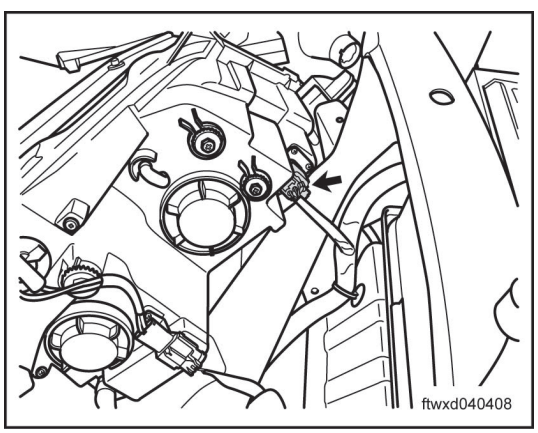
No > Maintenance or replace harness.

5 . Check the harness and connectors (right turn light - ground)

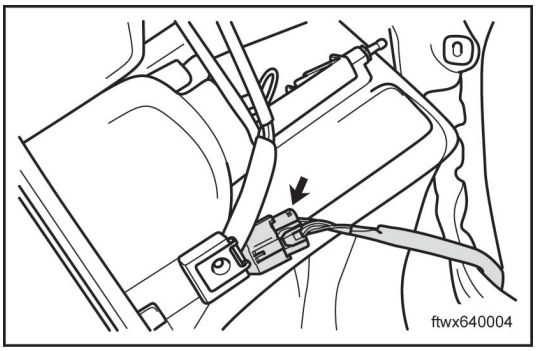
(a) Ignition Switch: OFF.



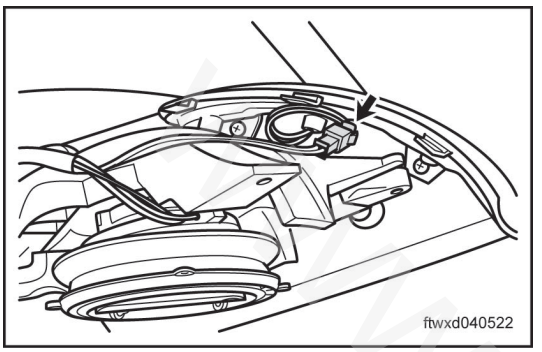
(b) Disconnect the connector C034 of BCM control unit.



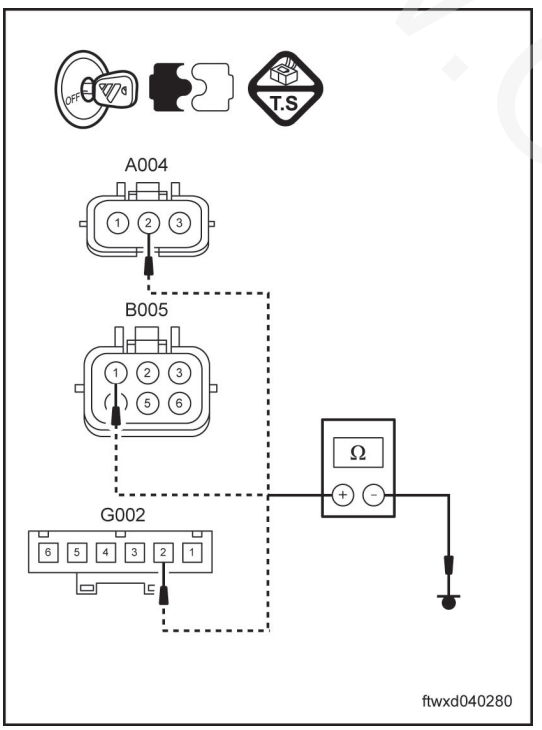
(c) Disconnect the right front turn light connector A004.



(d) Disconnect the right rear turn light connector B005.



(e) Disconnect the left rear-view mirror connector G002.



(f) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A004 (2) - ground	< 2 Ω
B005 (1) - Ground	
G002 (2) - ground	

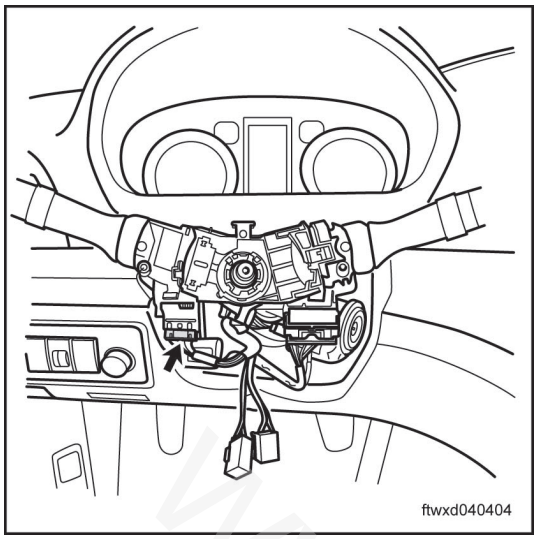
Check whether the result is normal?

Yes> go to step 6

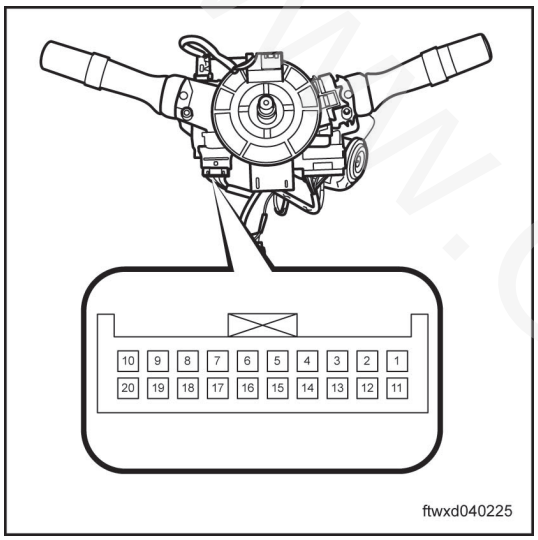
No > Maintenance or replace harness.

6 . Check the combination switch (lamplight switchover)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Check the combination switch (lamplight switchover)

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Turn off the right turn switch	18-19	$\geqslant$ 1 MΩ
Turn on the right turn switch	18-19	$<$ 2 Ω

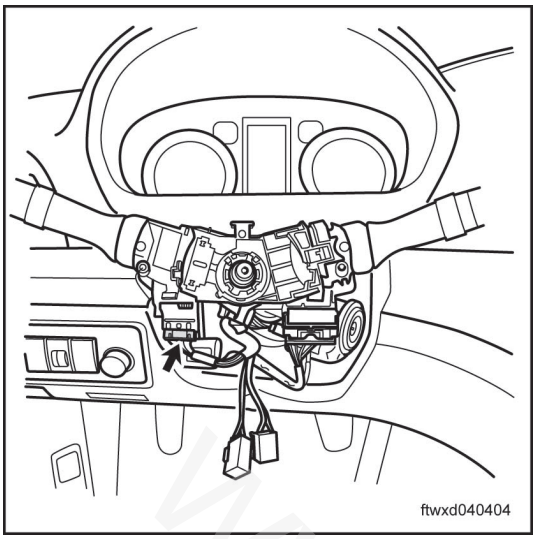
Check whether the result is normal?

Yes> go to step 7

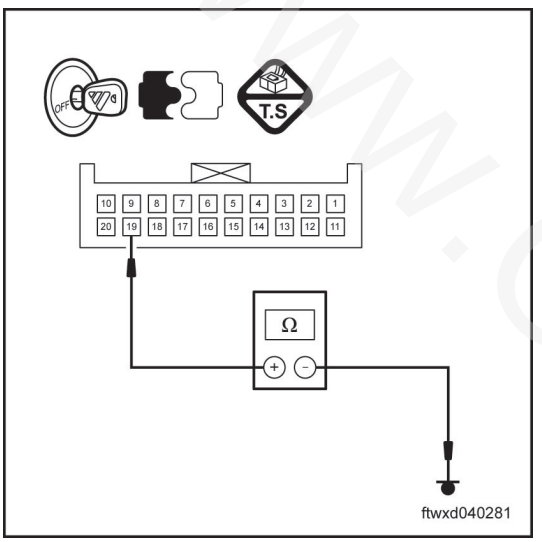
No > Replace the combination switch.

7 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C008 (19) - ground	< 2 Ω

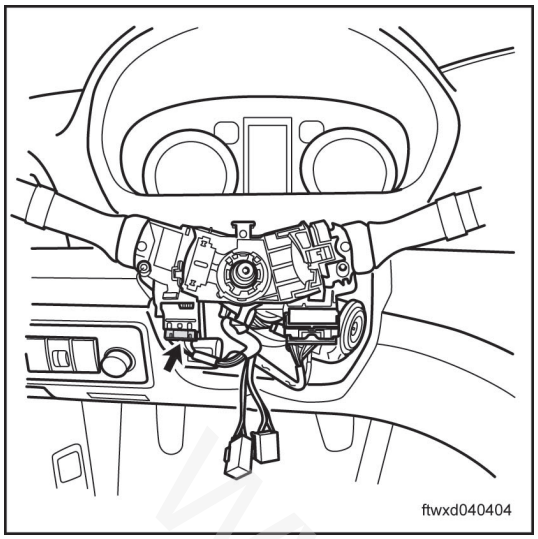
Check whether the result is normal?

Yes> go to step 8

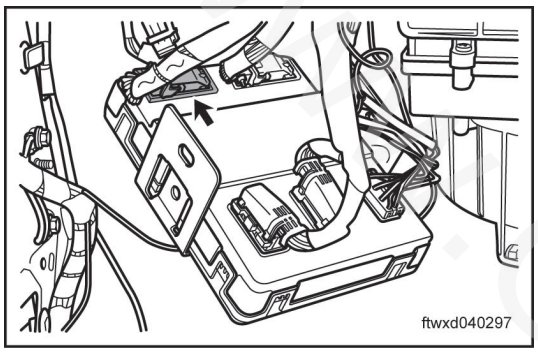
No > Maintenance or replace harness.

8 . Check the wiring harness and connectors (BCM controlling unit - combination switch)

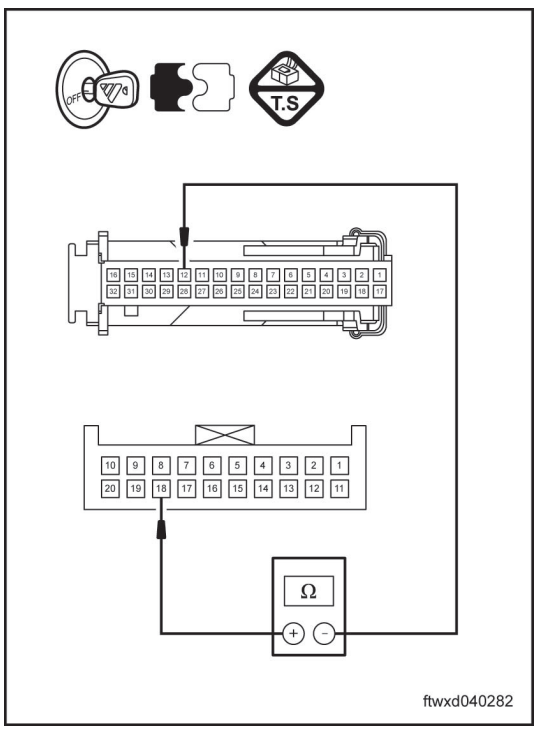
(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C036（E12） - C008（18）	＜2 Ω

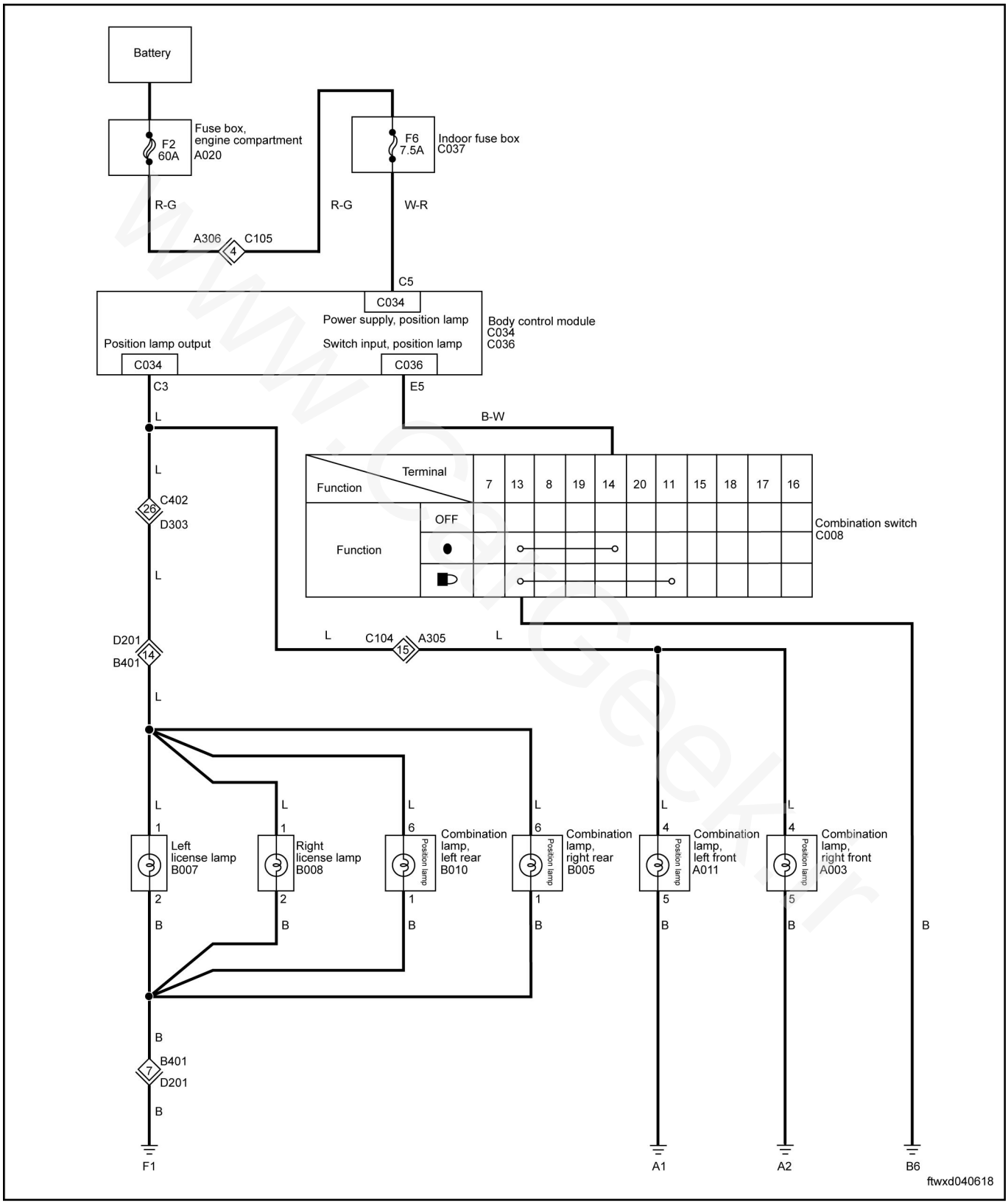
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1063LOW CURRENT OF PARKING LIGHT CONTROL CIRCUIT B1064TO-GROUND SHORT-CIRCUIT OF PARKING LIGHT CONTROL CIRCUIT

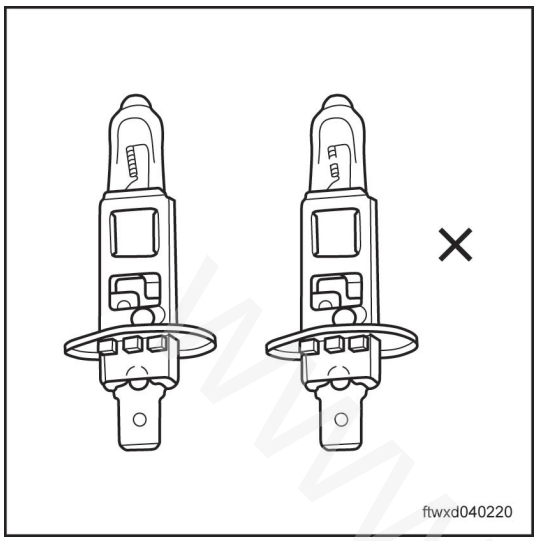
Circuit diagram



Diagnostic steps

1 . Check the parking light bulbs.

(a) Ignition Switch: OFF.



(b) Check whether or not the bulbs of parking lights are damaged.

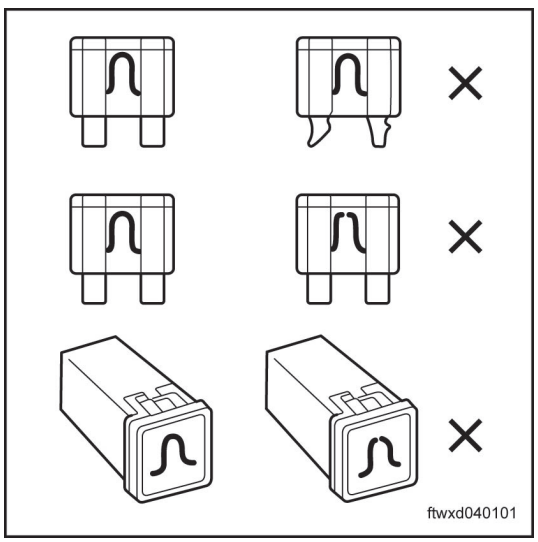
Check whether the result is normal?

Yes> go to step 2

No > Replace the parking light bulbs.

2 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F6 (7.5A) in the indoor fuse box.

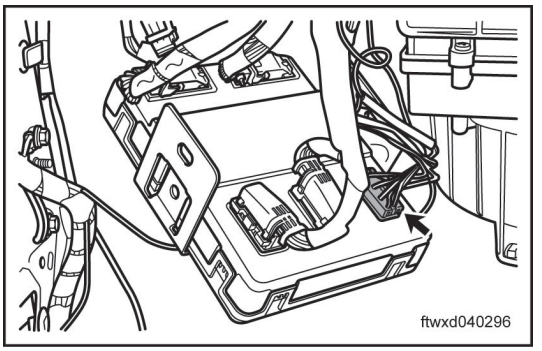
Check whether the result is normal?

Yes> go to step 3

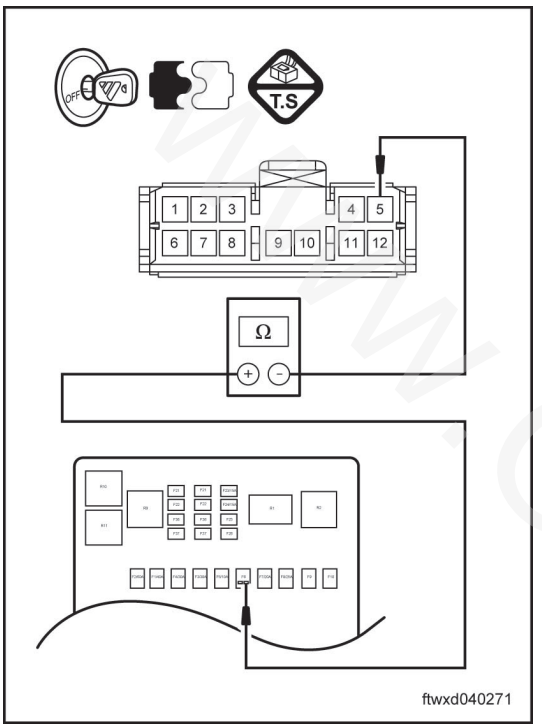
No> replace fuse

3 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C034 of BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F6(7.5A) - C034（C5）	＜ 2 Ω

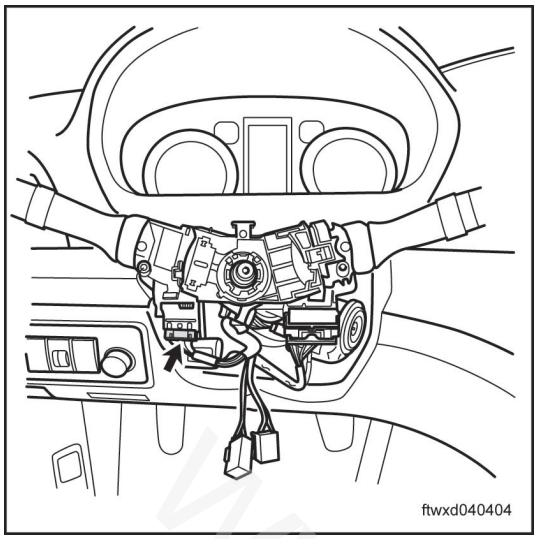
Check whether the result is normal?

Yes> go to step 4

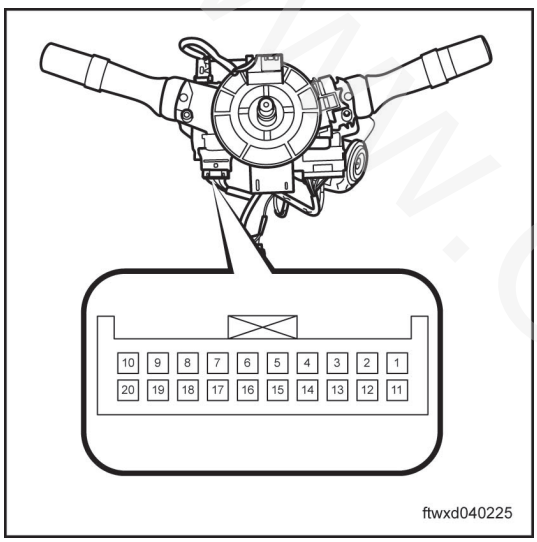
No > Maintenance or replace harness.

4 . Check the combination switch (lamplight switchover)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Check the combination switch (lamplight switchover)

Standard resistance:

Conditions	Multimeter connection stitch	Specified value
Turn off the parking light switch	13-14	$\geqslant$ 1 MΩ
Turn on the parking light switch	13-14	$<$ 2 Ω

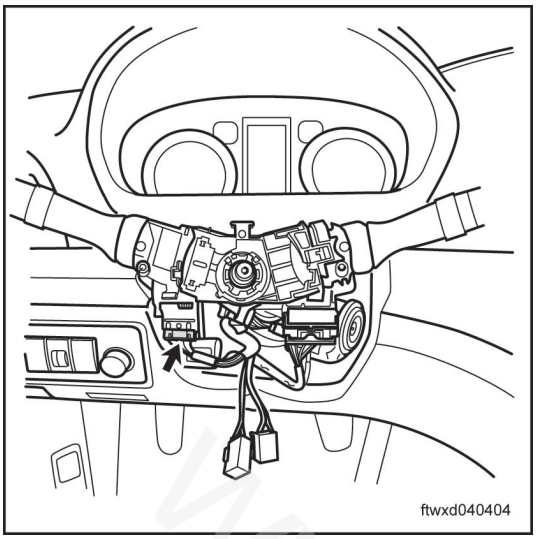
Check whether the result is normal?

Yes> go to step 5

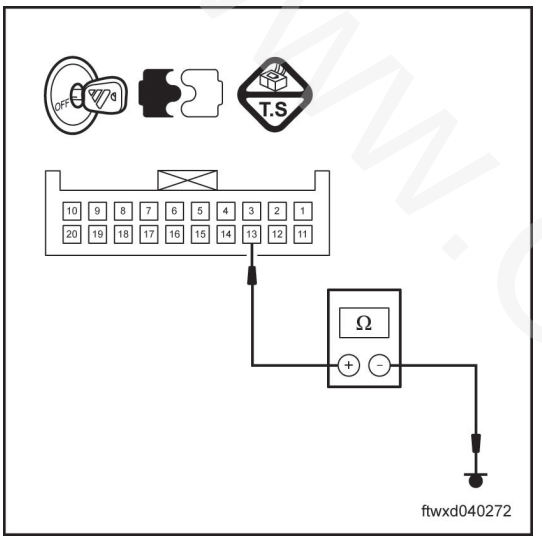
No > Replace the combination switch.

5 . Check the harness and connectors (combination switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C008 (13) - ground	< 2 Ω

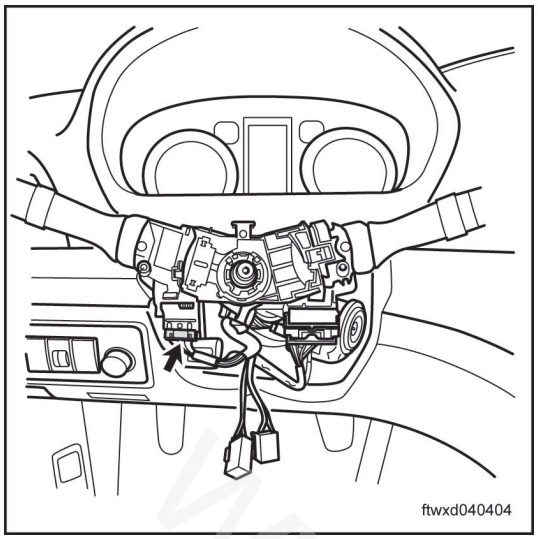
Check whether the result is normal?

Yes> go to step 6

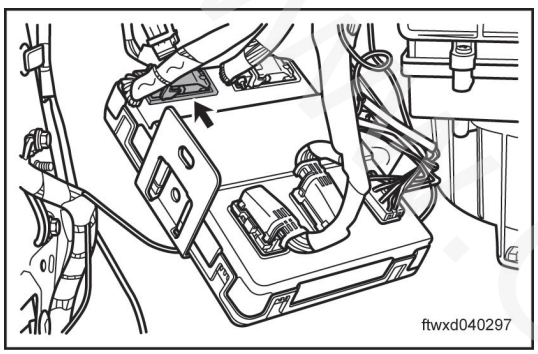
No > Maintenance or replace harness.

6 . Check the wiring harness and connectors (BCM controlling unit - combination switch)

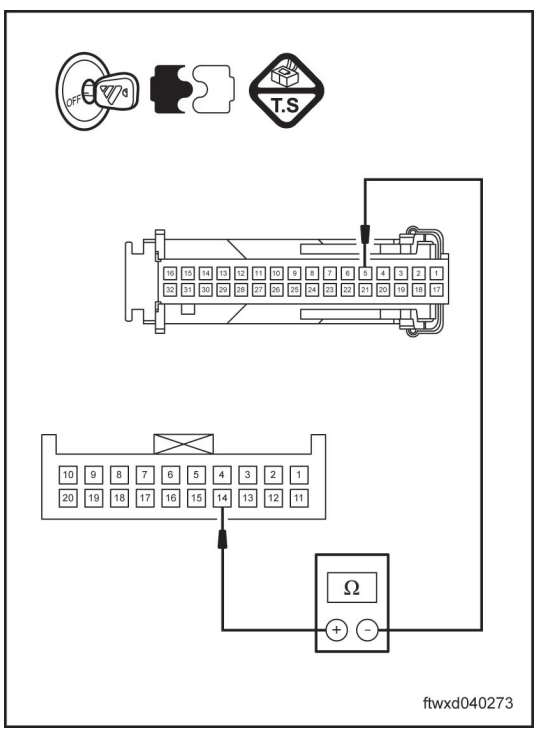
(a) Ignition Switch: OFF.



(b) Disconnect the connector C008 of combination switch (lamplight switchover).



(c) Disconnect the connector C036 of BCM control unit.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (Check for any open circuit)

Multimeter connection	Standard value
C036（E5） - C008（14）	＜ 2 Ω

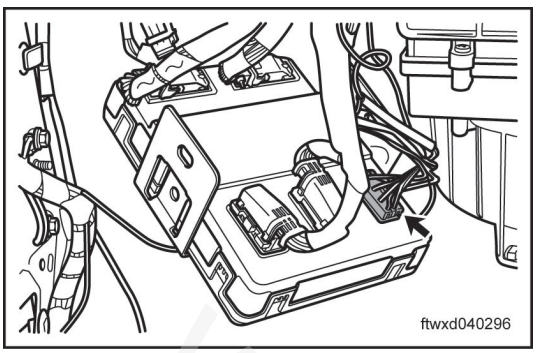
Check whether the result is normal?

Yes> go to step 7

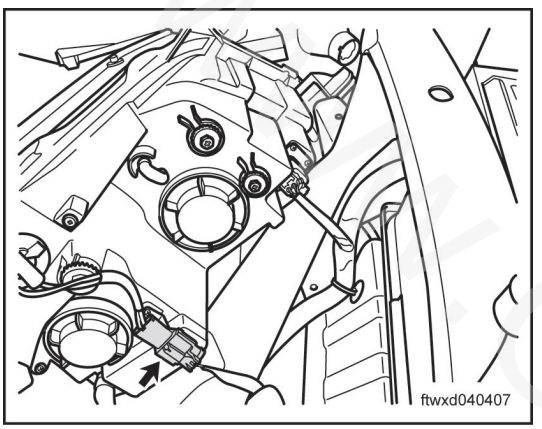
No > Maintenance or replace harness.

7 . Check the harness and connector (BCM control unit – front parking light)

(a) Ignition Switch: OFF.

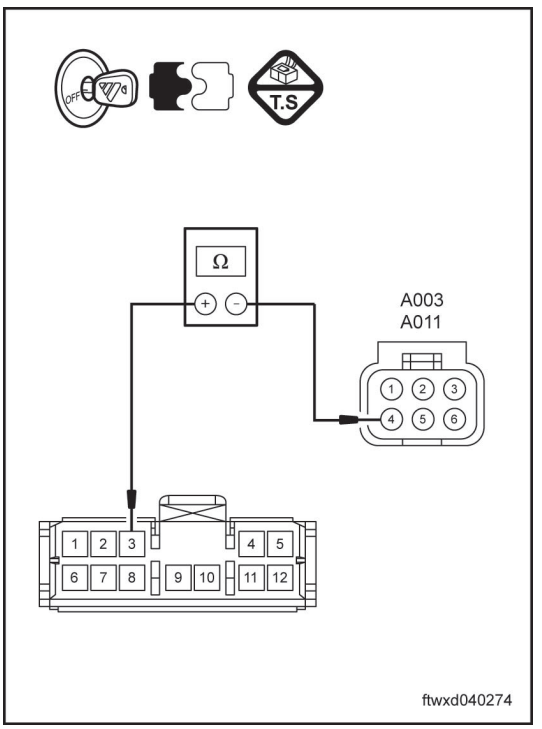


(b) Disconnect the connector C034 of BCM control unit.



(c) Disconnect the connector A011 of left front parking light.

(d) Disconnect the connector A011 of right front parking light.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C034（C3） - A011（4）	＜2 Ω
C034（C2） - A003（4）	

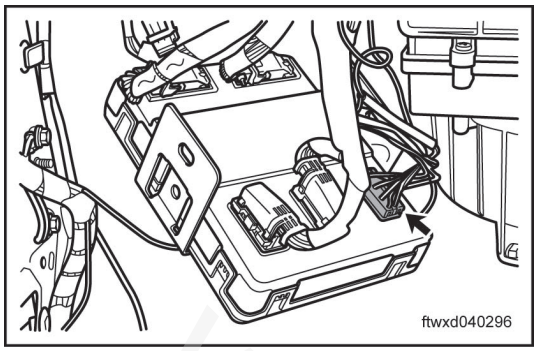
Check whether the result is normal?

Yes> go to step 8

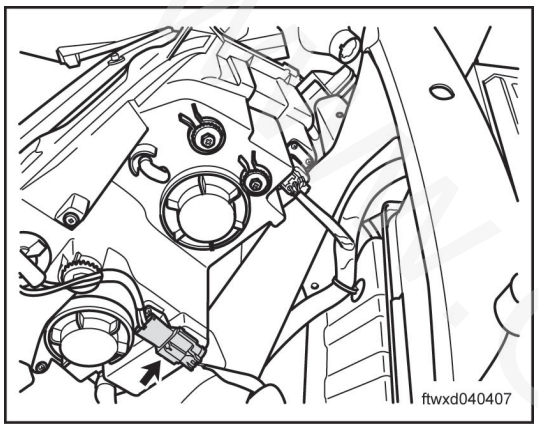
No > Maintenance or replace harness.

8 . Check the harness and connectors (front parking light - ground)

(a) Ignition Switch: OFF.

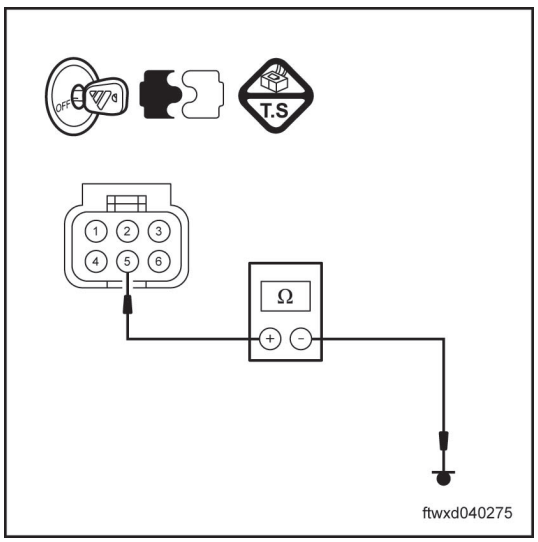


(b) Disconnect the connector C034 of BCM control unit.



(c) Disconnect the connector A011 of left front parking light.

(d) Disconnect the connector A011 of right front parking light.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
A011 (5) - ground	< 2 Ω
A003 (5) - ground	

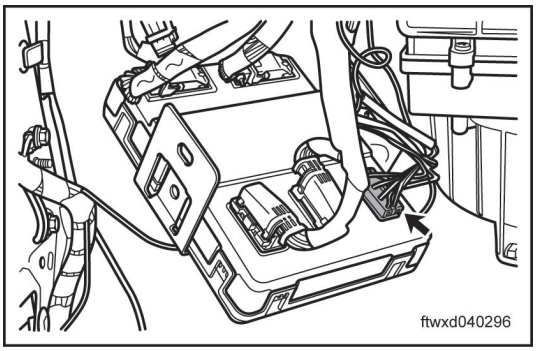
Check whether the result is normal?

Yes> go to step 9

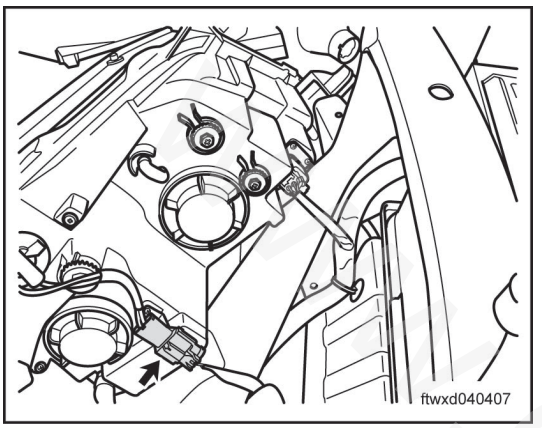
No > Maintenance or replace harness.

9 . Check the harness and connector (BCM control unit – rear parking light)

(a) Ignition Switch: OFF.

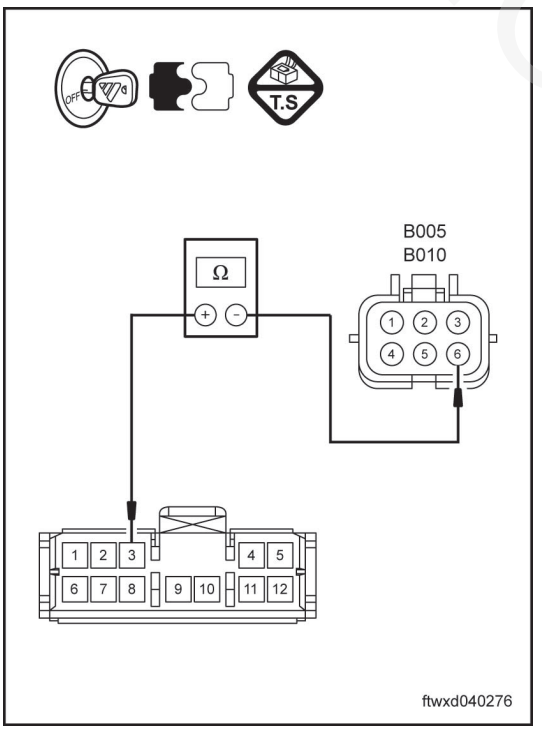


(b) Disconnect the connector C034 of BCM control unit.



(c) Disconnect the connector A011 of left front parking light.

(d) Disconnect the connector A011 of right front parking light.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C034（C3）- B010（6）	＜2 Ω
C034（C2）- B005（6）	

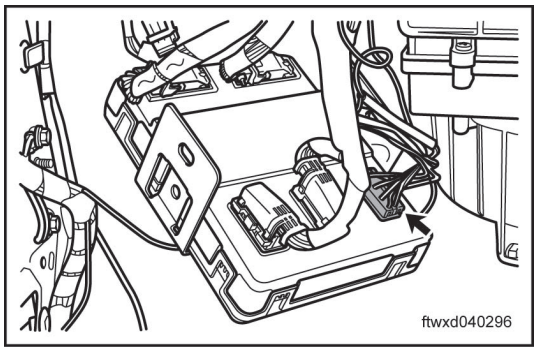
Check whether the result is normal?

Yes> go to step 10

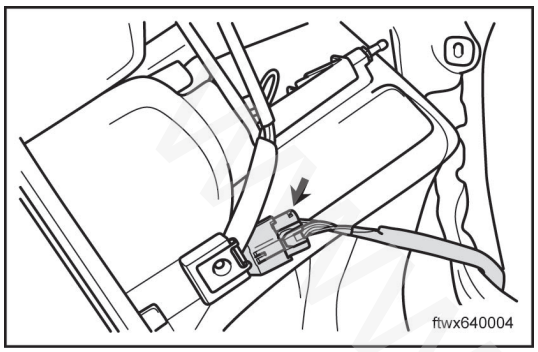
No > Maintenance or replace harness.

10 . Check the harness and connectors (rear parking light - ground)

(a) Ignition Switch: OFF.

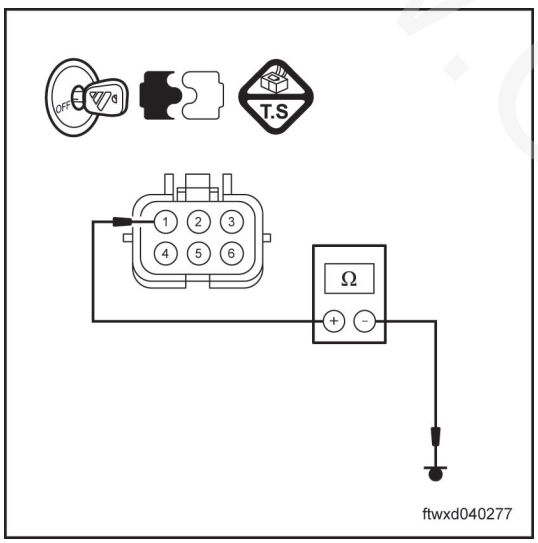


(b) Disconnect the connector C034 of BCM control unit.



(c) Disconnect the left rear parking light connector B010.

(d) Disconnect the right rear parking light connector B005.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
B010 (1) - Ground	< 2 Ω
B005 (1) - Ground	

Check whether the result is normal?

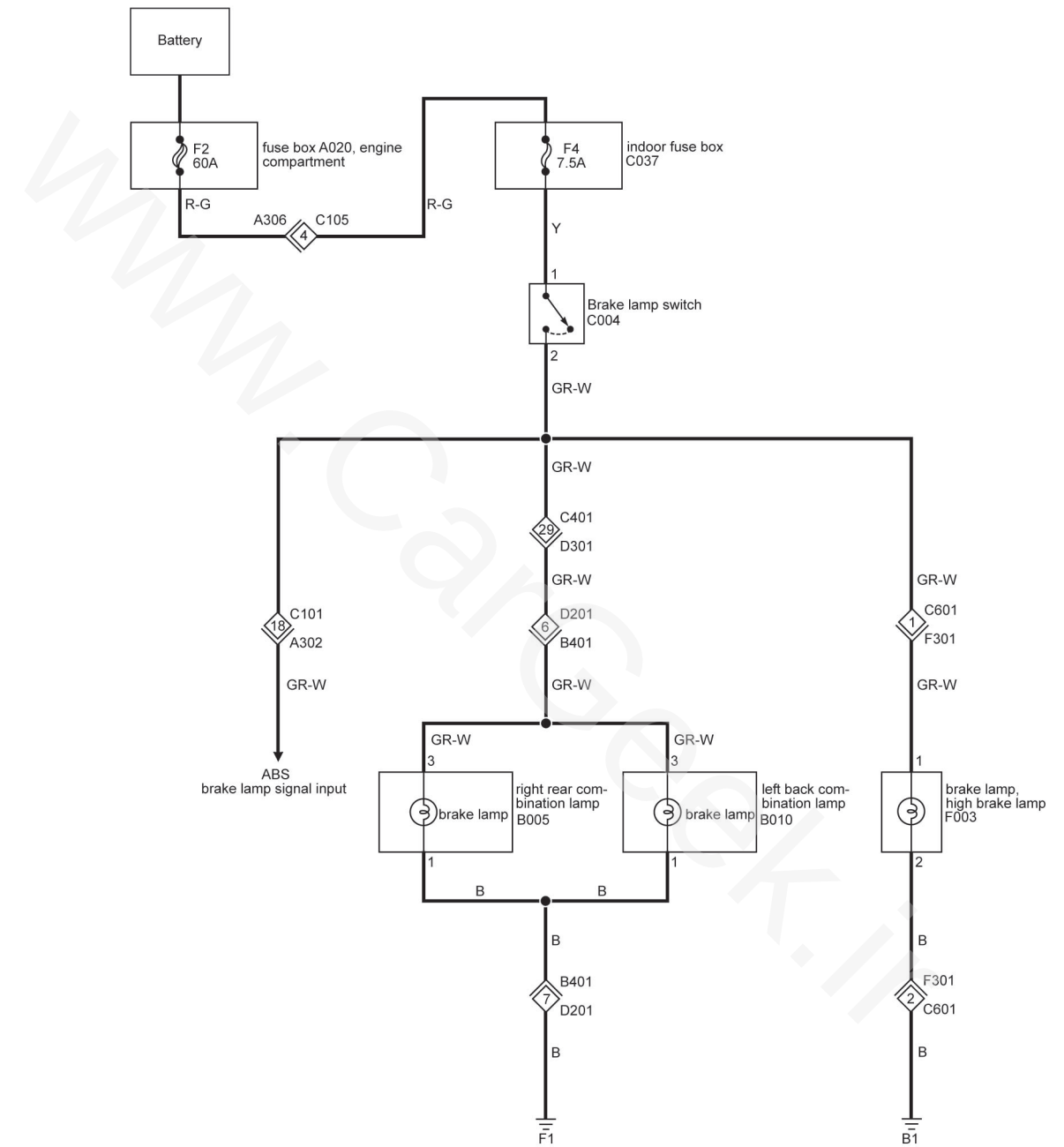
Yes> Replace BCM control unit.

No > Maintenance or replace harness.

BRAKES LAMPS ON 2 SIDES FAIL TO GO ON

Circuit diagram

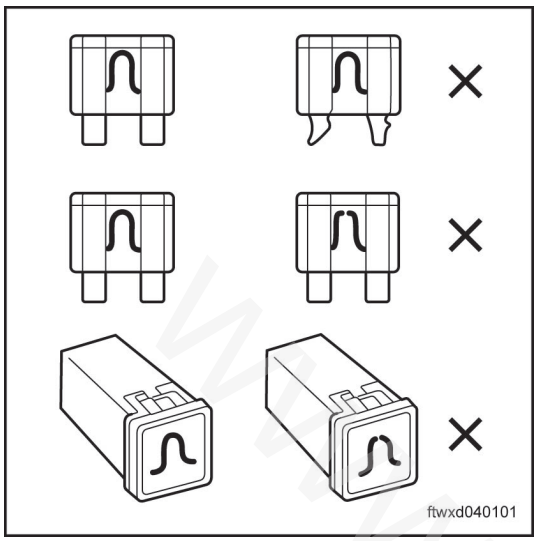
brake lamp system



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F2 (60A) inside the fuse box (A020) of engine compartment.

(c) Check the fuse F4 (7.5 A) in the indoor fuse box (A037).

Check whether the result is normal?

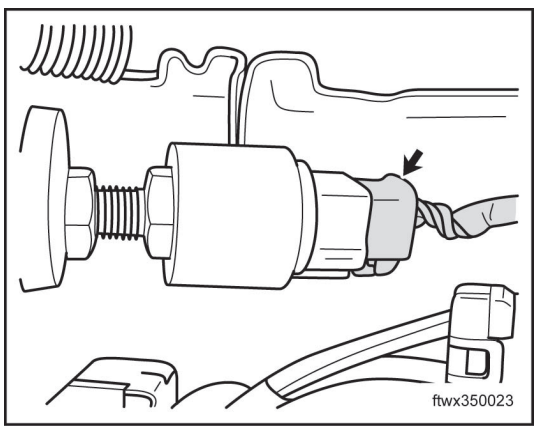
Yes> go to step 3

No > Go to the next step.

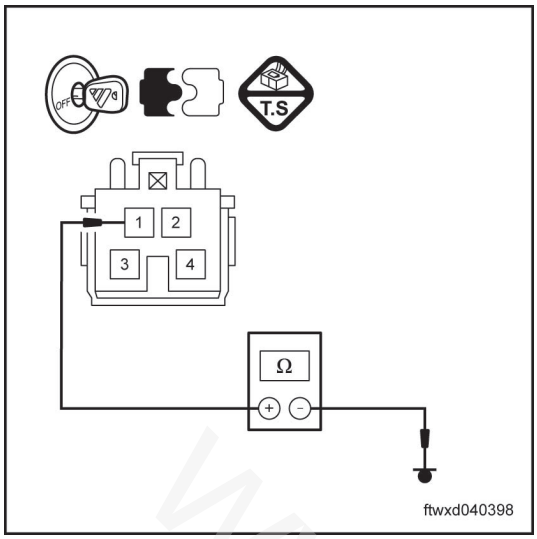
2 . Check the harness and connectors (brake lamp switch - ground)

(a) Disconnect battery negative cable.

(b) Unplug the fuse F4 (7.5 A) in the indoor fuse box (A037).



(c) Disconnect the driving braking switch connector C004.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Ground of multimeter	Standard value
C004 (1) - Ground	⩾1 MΩ

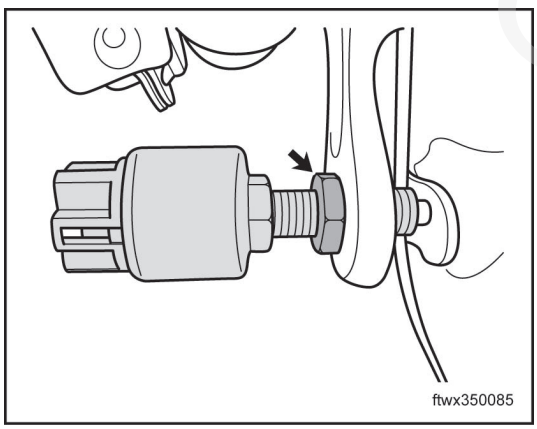
Check whether the result is normal?

Yes> Replace fuse

No > Maintenance or replace harness.

3 . Check the brake lamp switch

(a) Disconnect battery negative cable.



(b) Remove the brake lamp switch.

(c) Check the brake lamp switch.

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Turn off the brake lamp switch	1 - 2	⩾ 1 MΩ
Turn on the brake lamp switch	1 - 2	< 2 Ω

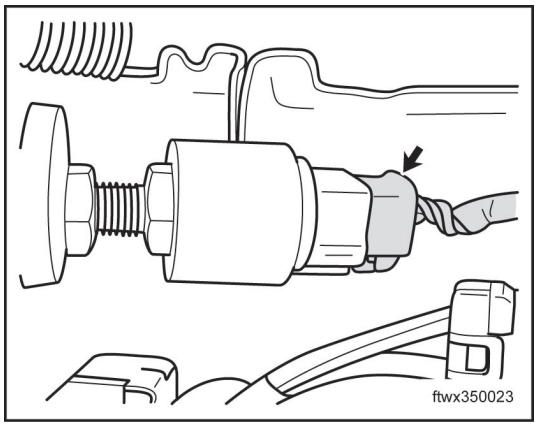
Check whether the result is normal?

Yes> go to step 4

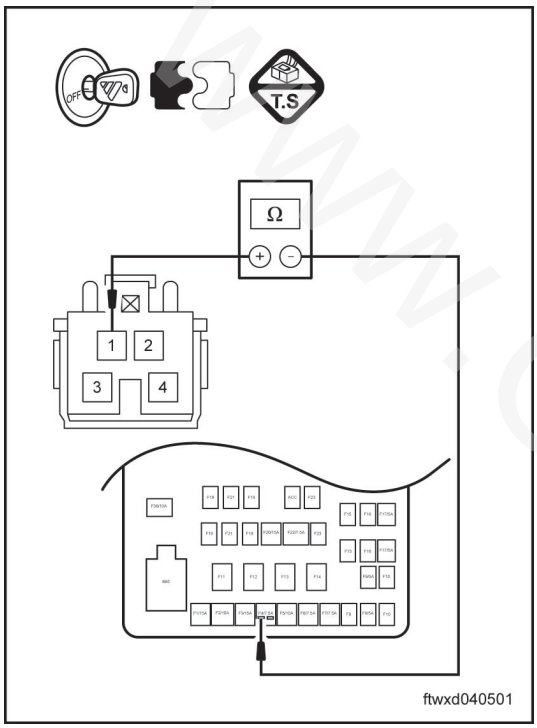
No > Replace the brake lamp switch.

4 . Check the harness and connectors (fuse – driving braking switch)

(a) Disconnect battery negative cable.



(b) Disconnect the driving braking switch connector C004.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F4（7.5 A） - C004（1）	＜ 2 Ω

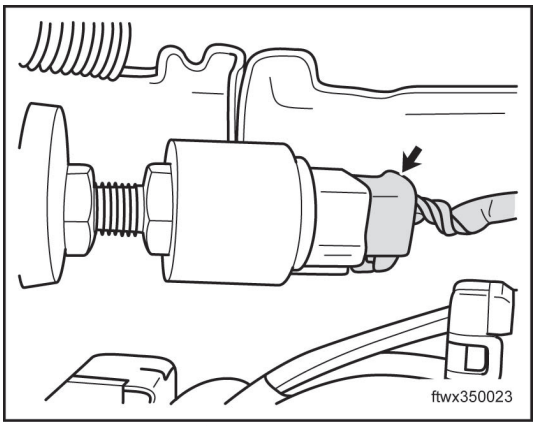
Check whether the result is normal?

Yes> go to step 5

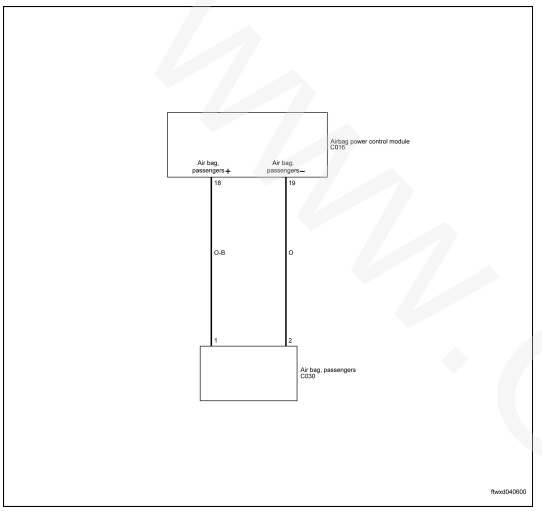
No > Maintenance or replace harness.

5 . Check the harness and connectors (driving brake lamp switch - brake lamp)

(a) Disconnect battery negative cable.



(b) Disconnect the brake lamp switch connector.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C004（2） - B005（3）	＜2 Ω
C004（2） - B010（3）	

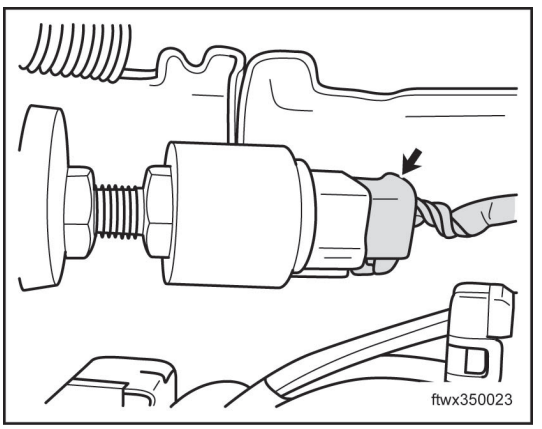
Check whether the result is normal?

Yes> go to step 6

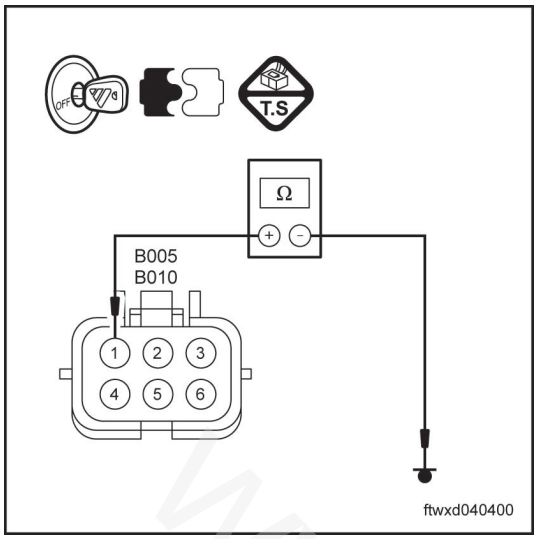
No > Maintenance or replace harness.

6 . Check the harness and connectors (brake lamp - ground)

(a) Disconnect battery negative cable.



(b) Disconnect the brake lamp switch connector.



Check whether the result is normal?

Yes > Replace the bulb.

No > Maintenance or replace harness.

(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

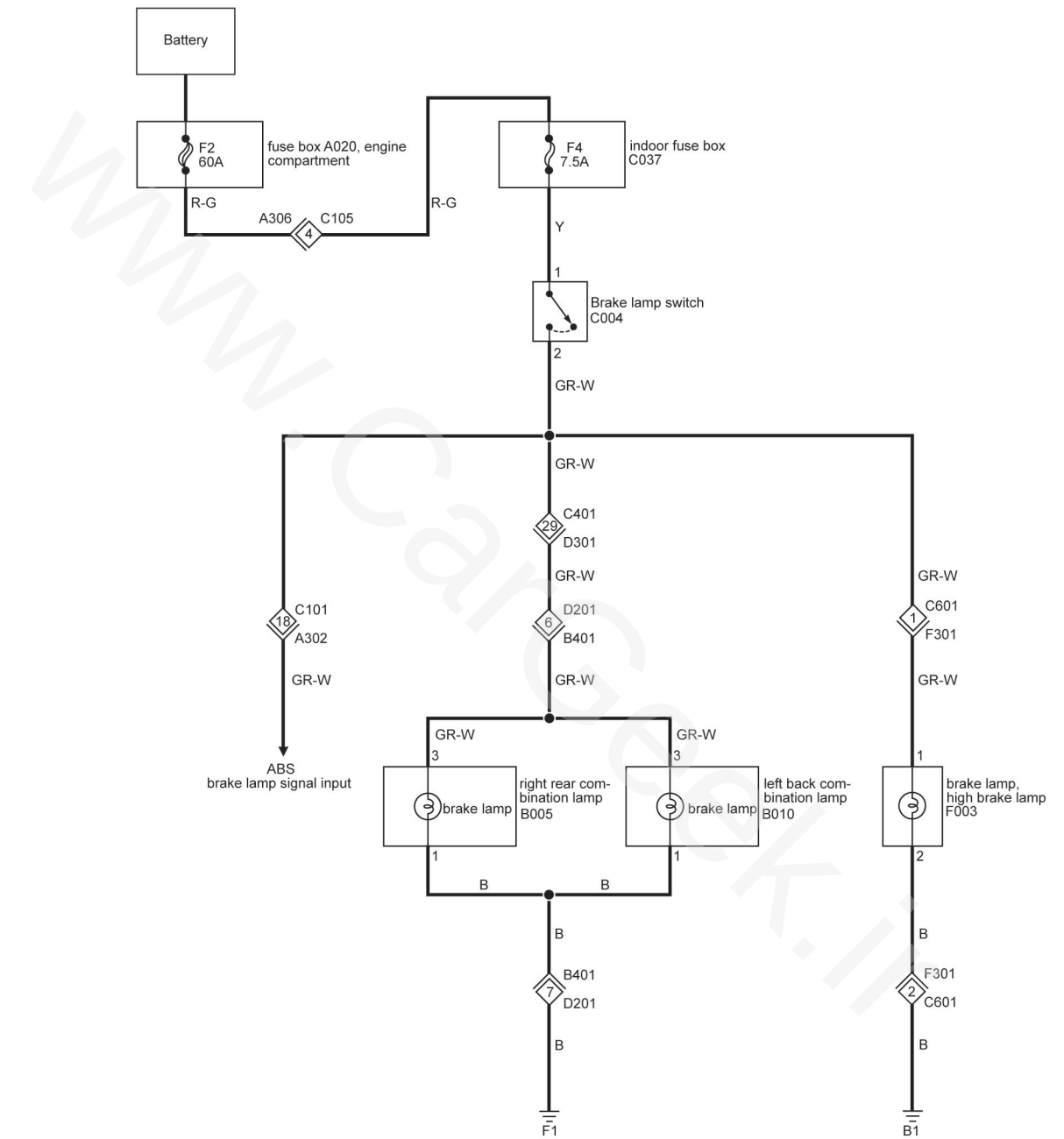
Multimeter connection	Standard value
B005 (1) - Ground	< 2 Ω
B010 (1) - Ground	

04

TOP BRAKES LAMPS FAIL TO GO ON

Circuit diagram

brake lamp system

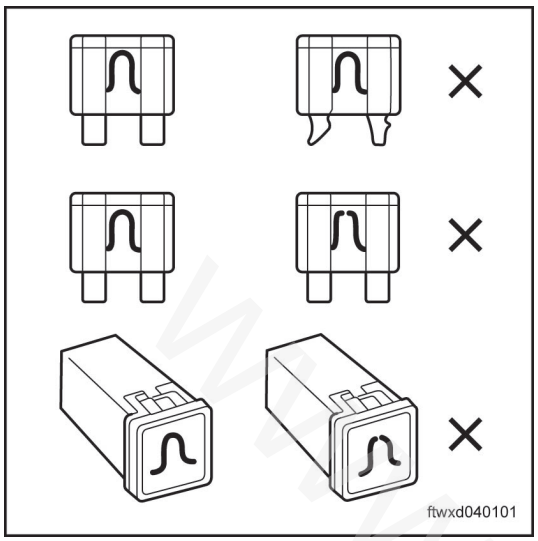


ftwxd040550

Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F2 (60A) inside the fuse box (A020) of engine compartment.

(c) Check the fuse F4 (7.5 A) in the indoor fuse box (A037).

Check whether the result is normal?

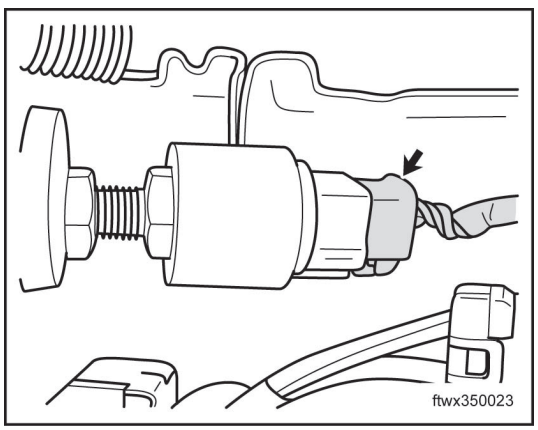
Yes> go to step 3

No > Go to the next step.

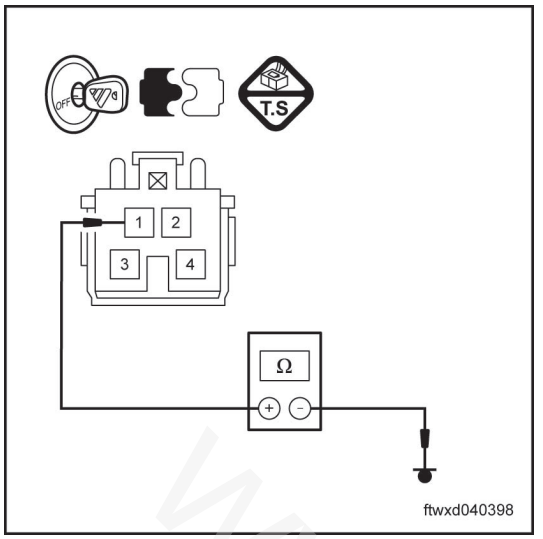
2 . Check the harness and connectors (brake lamp switch - ground)

(a) Disconnect battery negative cable.

(b) Unplug the fuse F4 (7.5 A) in the indoor fuse box (A037).



(c) Disconnect the driving braking switch connector C004.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Ground of multimeter	Standard value
C004 (1) - Ground	⩾1 MΩ

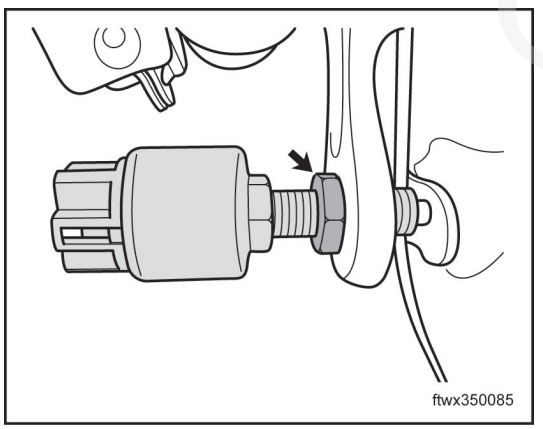
Check whether the result is normal?

Yes> Replace fuse

No > Maintenance or replace harness.

3 . Check the brake lamp switch

(a) Disconnect battery negative cable.



(b) Remove the brake lamp switch.

(c) Check the brake lamp switch.

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Turn off the brake lamp switch	1 - 2	⩾ 1 MΩ
Turn on the brake lamp switch	1 - 2	< 2 Ω

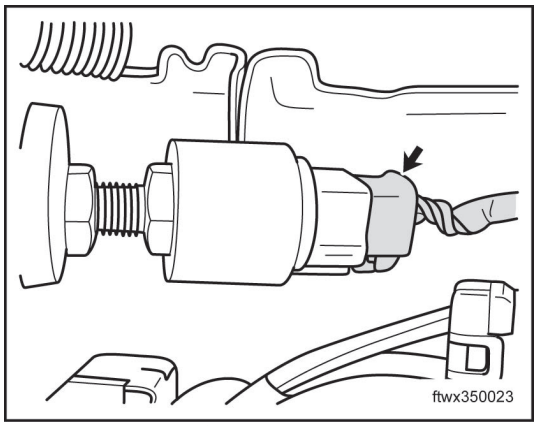
Check whether the result is normal?

Yes> go to step 4

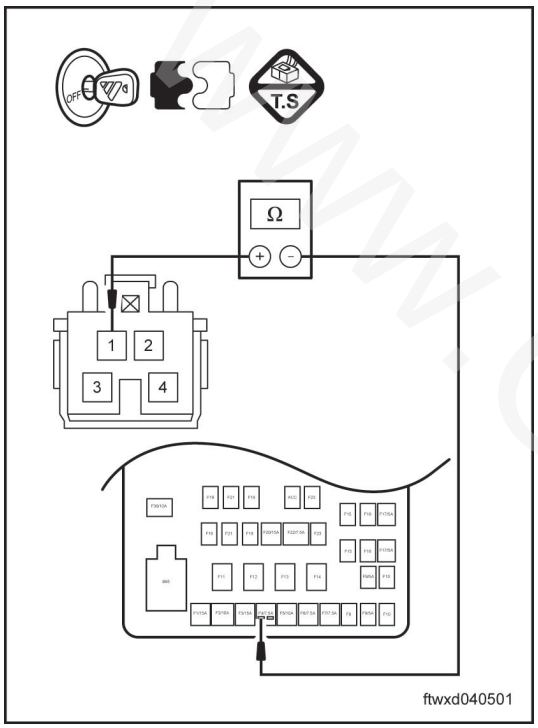
No > Replace the brake lamp switch.

4 . Check the harness and connectors (fuse – driving braking switch)

(a) Disconnect battery negative cable.



(b) Disconnect the driving braking switch connector C004.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F4（7.5 A） - C004（1）	＜ 2 Ω

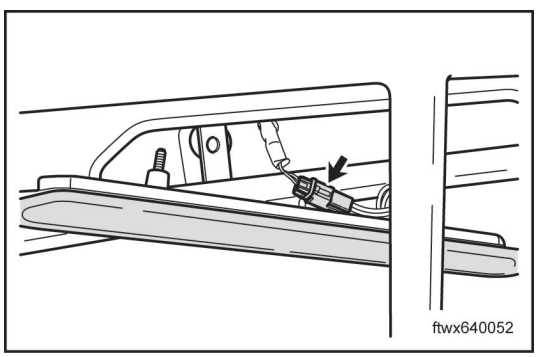
Check whether the result is normal?

Yes> go to step 5

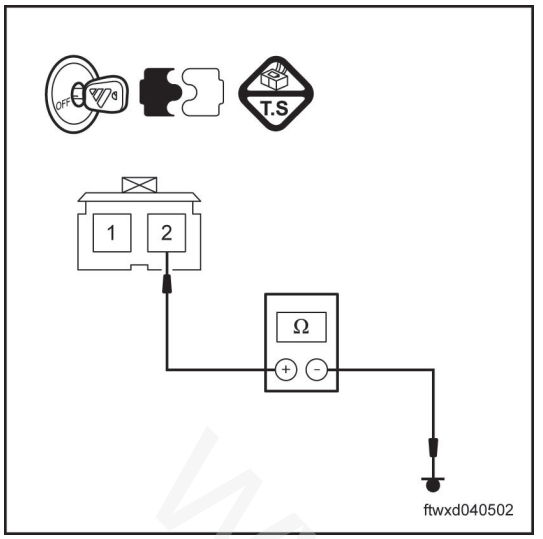
No > Maintenance or replace harness.

5 . Check the harness and connectors (top brake lamp - ground)

(a) Disconnect battery negative cable.



(b) Disconnect the top brake lamp connector F003.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F003 (2) - ground	< 2 Ω

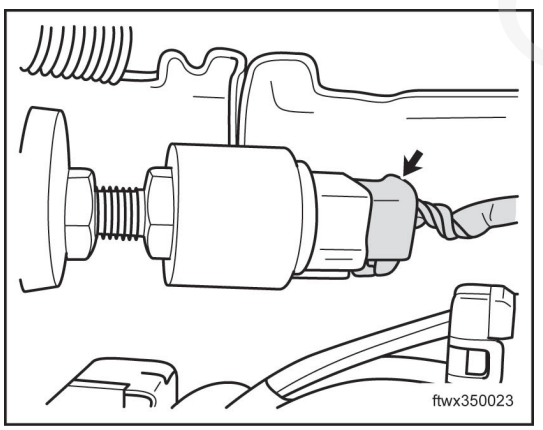
Check whether the result is normal?

Yes> go to step 6

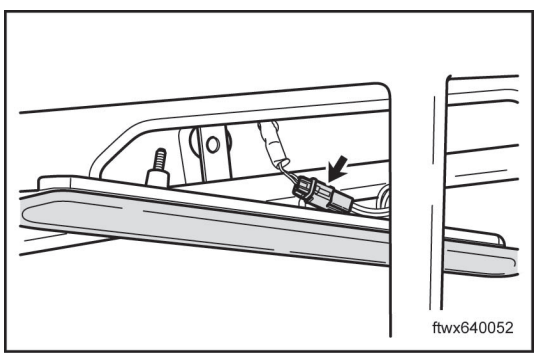
No > Maintenance or replace harness.

6 . Check the harness and connectors (driving brake lamp switch – top brake lamp)

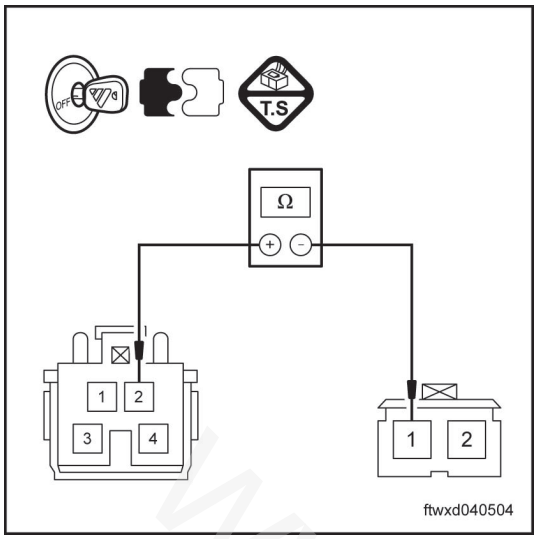
(a) Disconnect battery negative cable.



(b) Disconnect the driving braking switch connector C004.



(c) Disconnect the top brake lamp connector F003.



Check whether the result is normal?

Yes > Replace the bulb.

No > Maintenance or replace harness.

(d) Measure the electrical resistance based on the value in the following form.

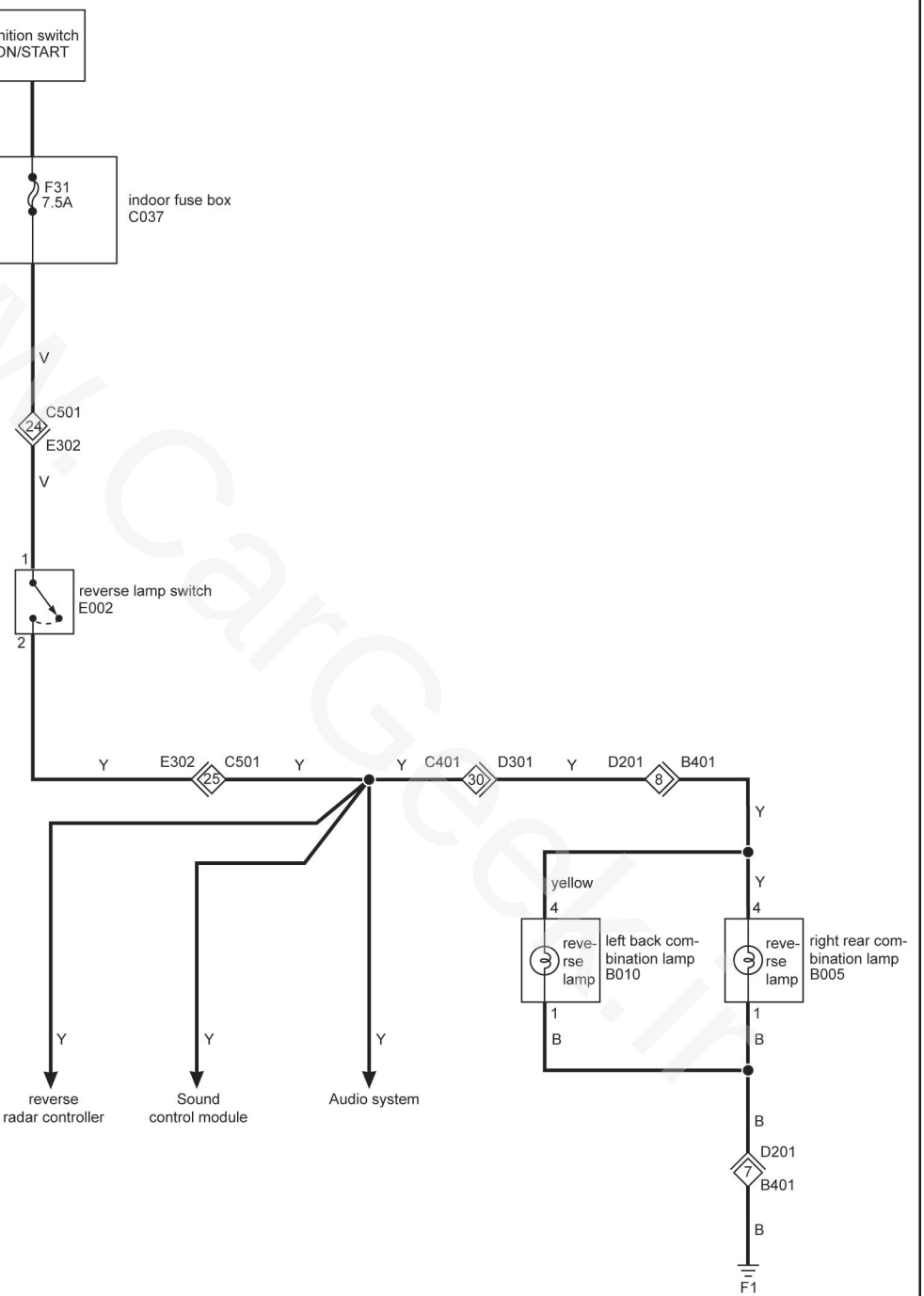
Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C004（2） - F003（1）	＜ 2 Ω

REVERSE LAMPS ON 2 SIDES FAIL TO GO ON

Circuit diagram

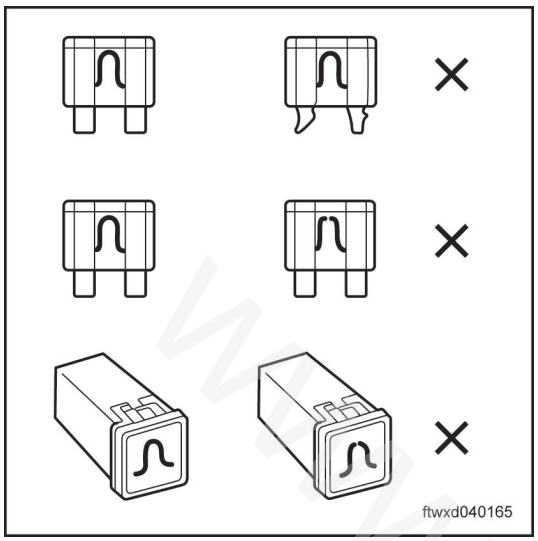
reverse lamp system



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F31 (7.5A) in the vehicle body fuse box (C301).

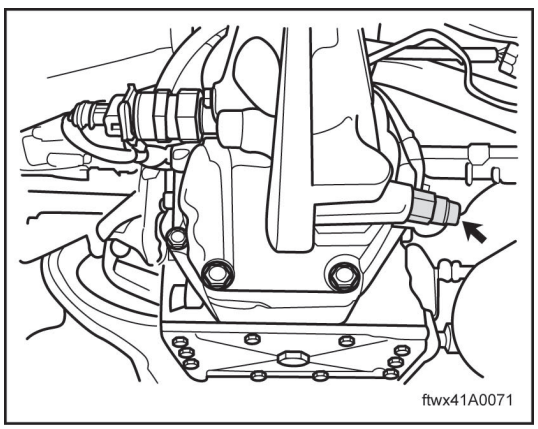
Check whether the result is normal?

Yes> go to step 3

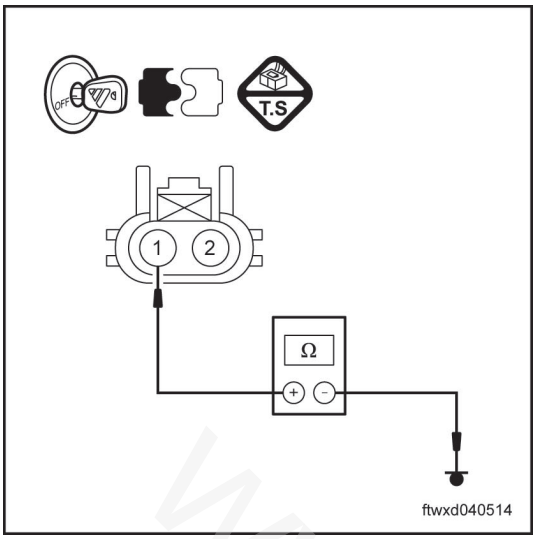
No> go to step 2

2 . Check the harness and connectors (reverse lamp switch - ground)

(a) Ignition Switch: OFF.



(b) Disconnect reverse lamp switch connector E002.



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
B002 (1) - Ground	⩾1 MΩ

Check whether the result is normal?

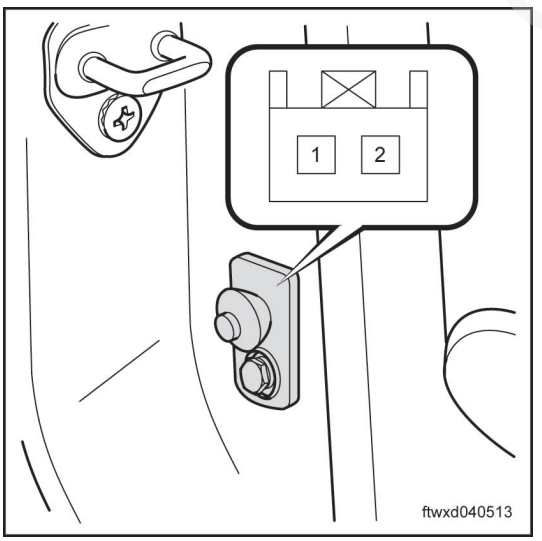
Yes> go to step 3

No > Maintenance or replace harness.

3 . Check reverse lamp switch

(a) Ignition Switch: OFF.

(b) Remove the reverse lamp switch (see "Chapter 31 Transmission - transmission, replacement").



(c) Check the reverse lamp switch.

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Turn off the reverse lamp switch	1 - 2	⩾ 1 MΩ
Turn on the reverse lamp switch	1 - 2	＜ 2 Ω

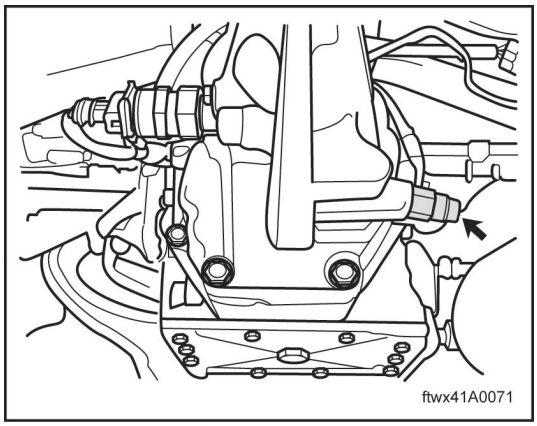
Check whether the result is normal?

Yes> go to step 4

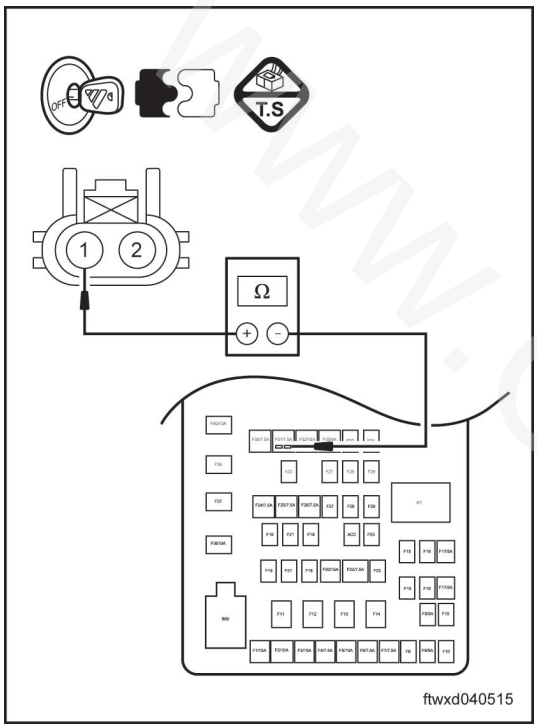
No > Replace the reverse lamp switch.

4 . Check the harness and connectors (reverse lamp fuse – reverse lamp switch)

(a) Ignition Switch: OFF.



(b) Disconnect reverse lamp switch connector E002.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F31（7.5 A） - E002（1）	＜ 2 Ω

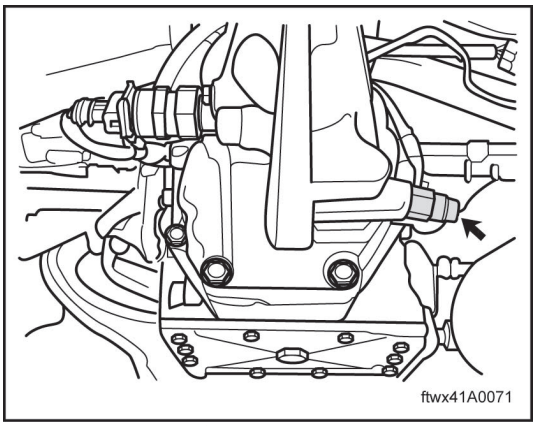
Check whether the result is normal?

Yes> go to step 5

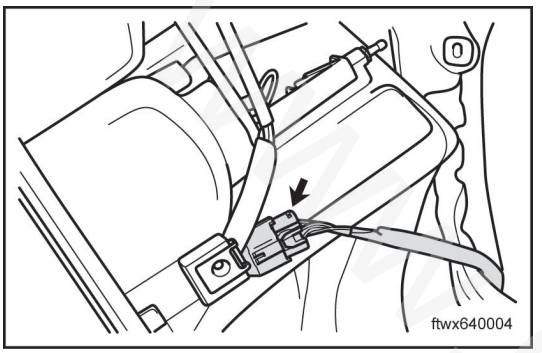
No > Maintenance or replace harness.

5 . Check the harness and connectors (reverse lamp switch - rear combination lamp)

(a) Ignition Switch: OFF.

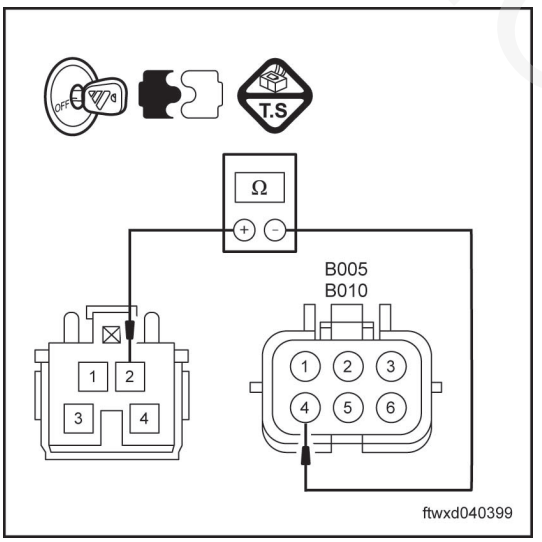


(b) Disconnect reverse lamp switch connector E002.



(c) Disconnect the left rear combination lamp switch connector B010.

(d) Disconnect the right rear combination lamp switch connector B005.



(e) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
E002（2） - B010（4）	＜2 Ω
E002（2） - B005（4）	

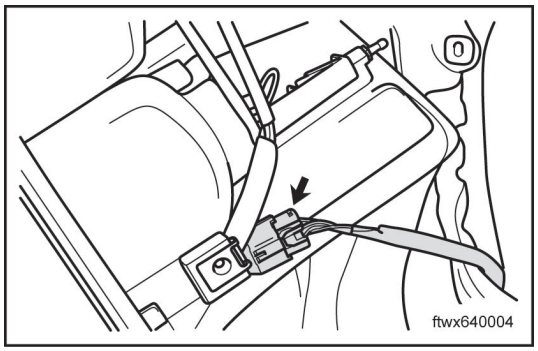
Check whether the result is normal?

Yes> go to step 6

No > Maintenance or replace harness.

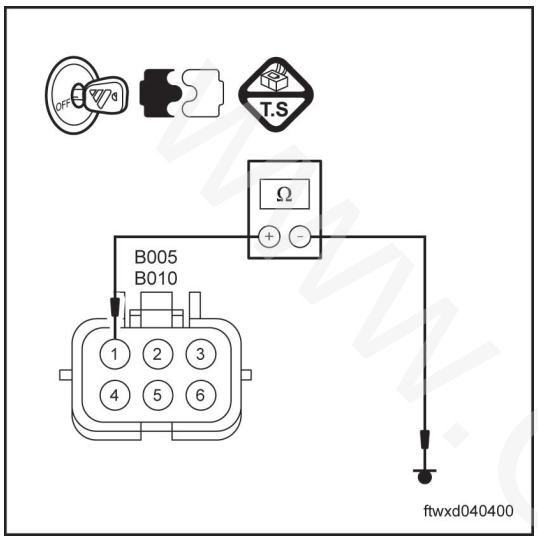
6 . Check the harness and connectors (rear combination lamp - ground)

(a) Ignition Switch: OFF.



(b) Disconnect the left rear combination lamp switch connector B010.

(c) Disconnect the right rear combination lamp switch connector B005.



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
B010 (1) - Ground	< 2 Ω
B005 (1) - Ground	

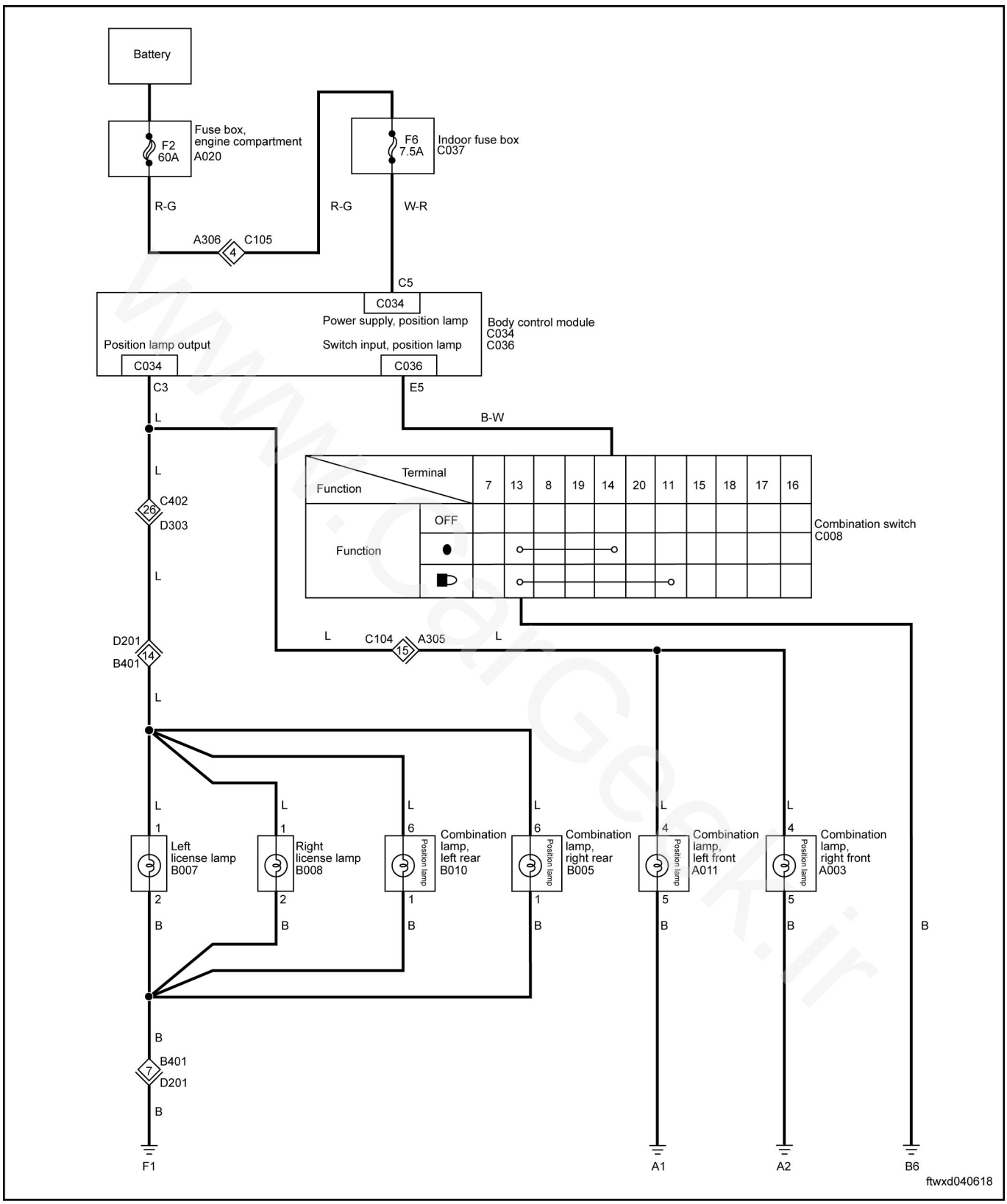
Check whether the result is normal?

Yes > Replace the bulb.

No > Maintenance or replace harness.

POSITION LIGHTS/LICENSE PLATE LAMP FAIL TO GO ON

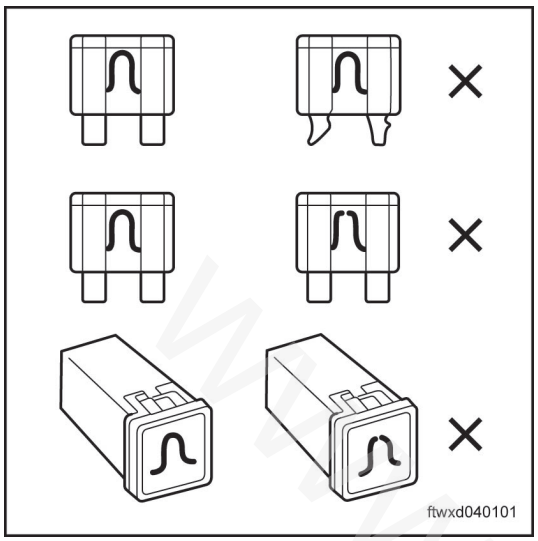
Circuit diagram



Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F2 (60A) inside the fuse box (A020) of engine compartment.

(c) Check the fuse F6 (7.5 A) in the indoor fuse box (A037).

Check whether the result is normal?

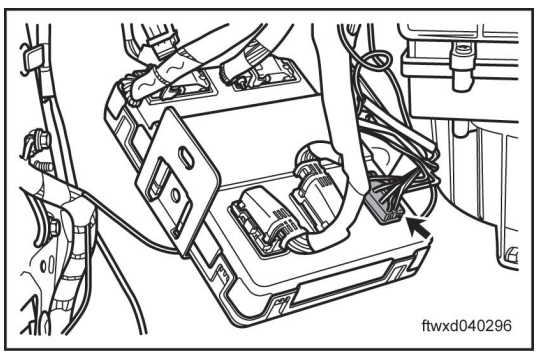
Yes> go to step 3

No > Go to the next step.

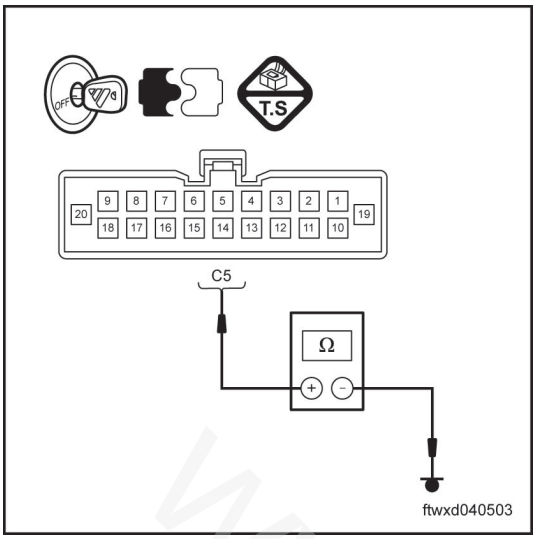
2 . Check the harness and connectors (vehicle body controller -ground)

(a) Disconnect battery negative cable.

(b) Unplug the fuse F6 (7.5 A) in the indoor fuse box (A037).



(c) Disconnect the connector C034 of the vehicle body controller.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Ground of multimeter	Standard value
C034 (C5) - ground	⩾1 MΩ

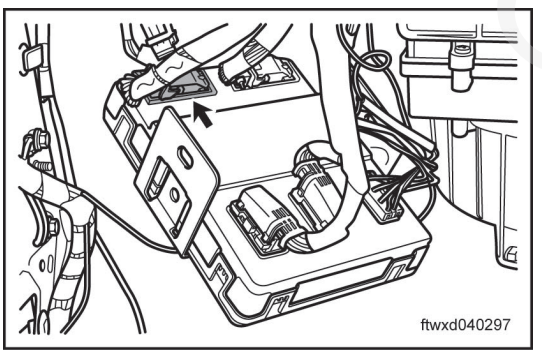
Check whether the result is normal?

Yes> Replace fuse

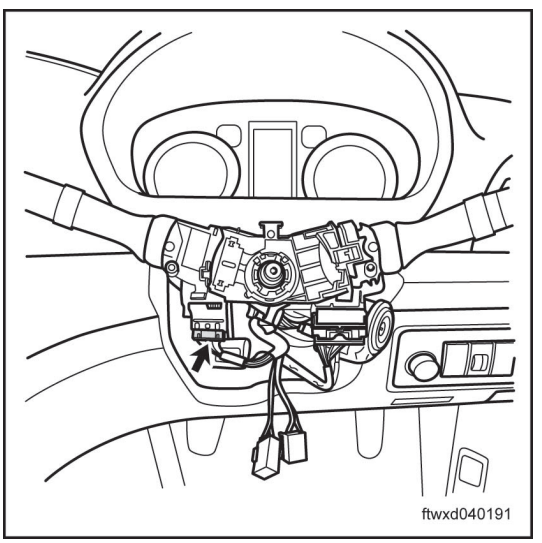
No > Maintenance or replace harness.

3 . Check the harness and connectors (vehicle body controller - combination switch (turn)).

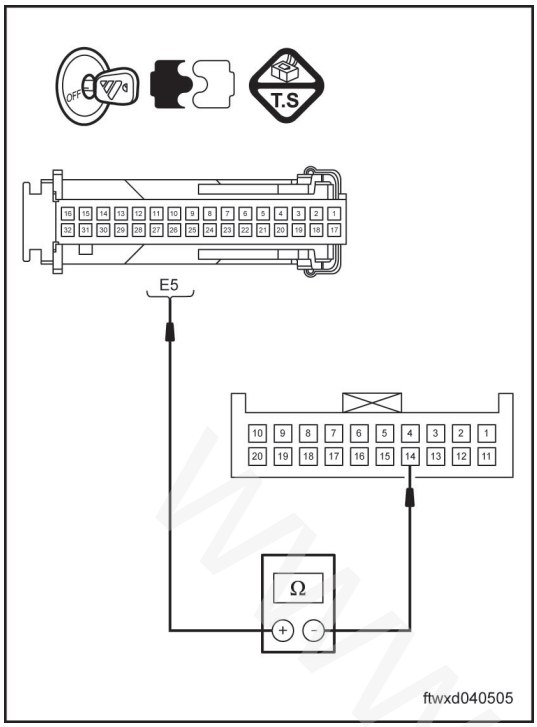
(a) Disconnect battery negative cable.



(b) Disconnect connector C036, body controller



(c) Disconnect the connector C008 of combination switch (turn).



(d) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C036（E5） - C008（14）	＜ 2 Ω

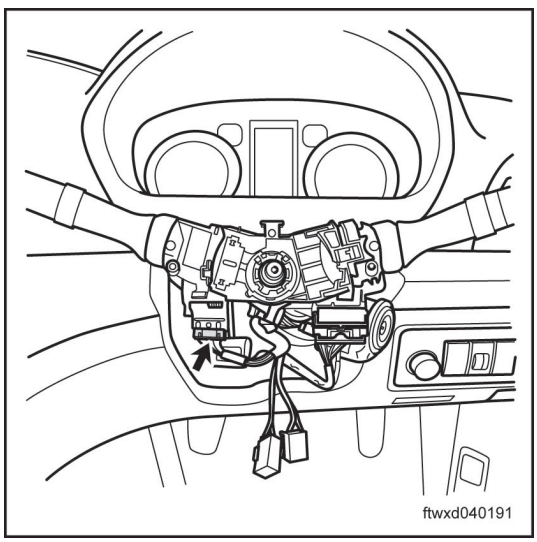
Check whether the result is normal?

Yes> go to step 4

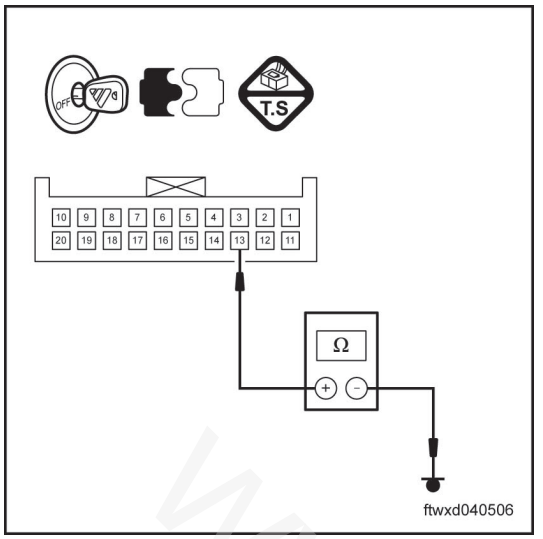
No > Maintenance or replace harness.

4 . Check the harness and connectors (combination switch (turn) - ground)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C008 of combination switch (turn).



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Ground of multimeter	Standard value
C008 (13) - ground	< 2 Ω

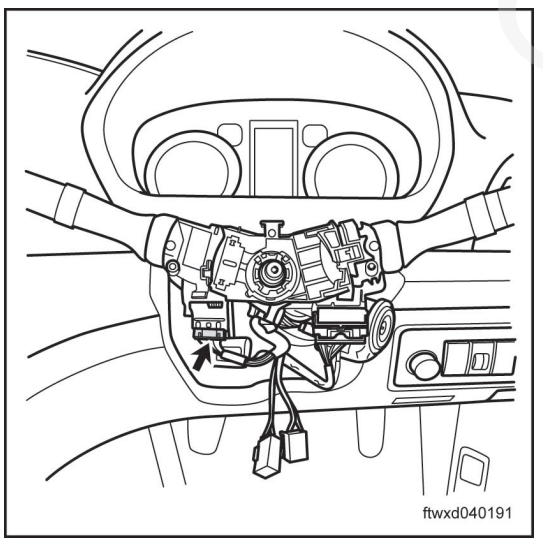
Check whether the result is normal?

Yes> go to step 5

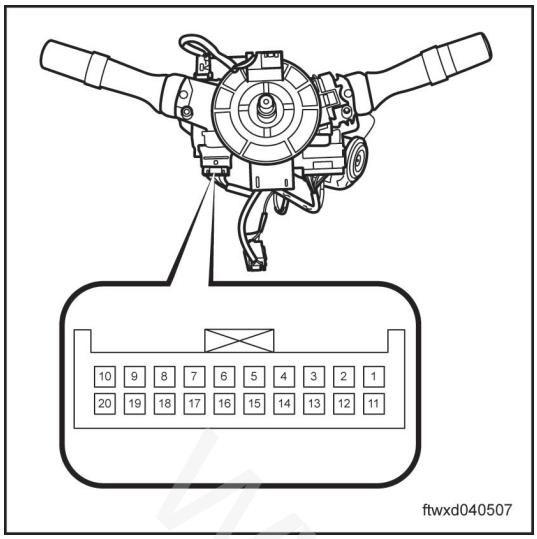
No > Maintenance or replace harness.

5 . Check the combination switch (turn)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C008 of combination switch (turn).



(c) Check the combination switch (turn)

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Open the combination switch and position light cover	14 - 13	< 2 Ω

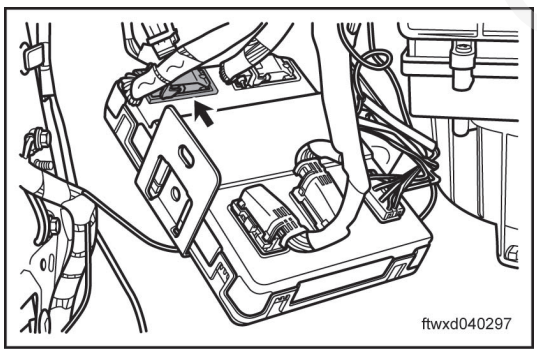
Check whether the result is normal?

Yes> go to step 6

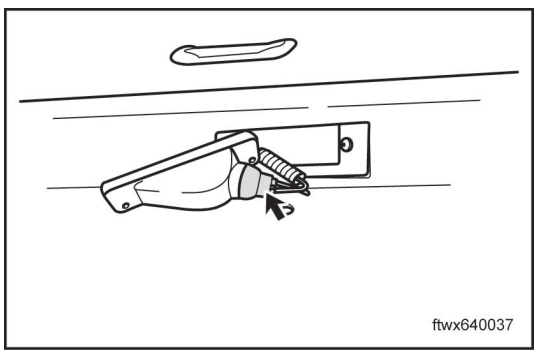
No > Replace the combination switch (turn).

6 . Check the harness and connectors (vehicle body controller - license plate lamp/position light ground)

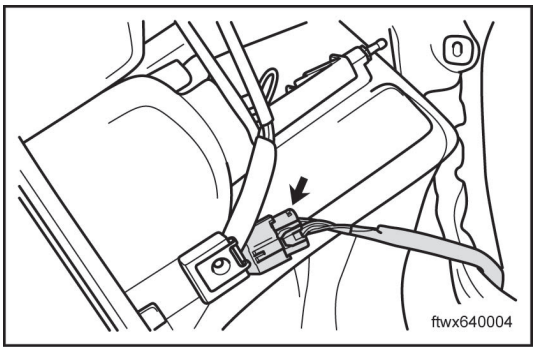
(a) Disconnect battery negative cable.



(b) Disconnect connector C036, body controller

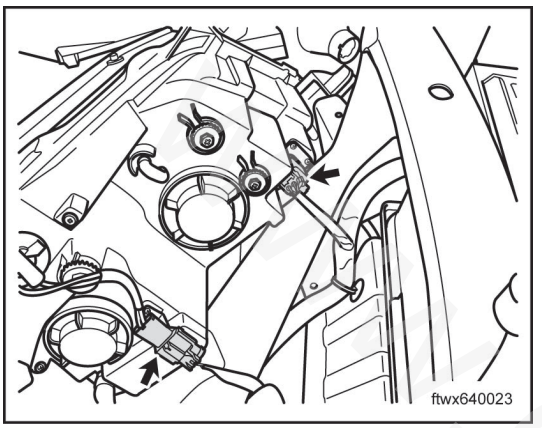


(c) Disconnect the license plate lamp connectors B007 and B008.



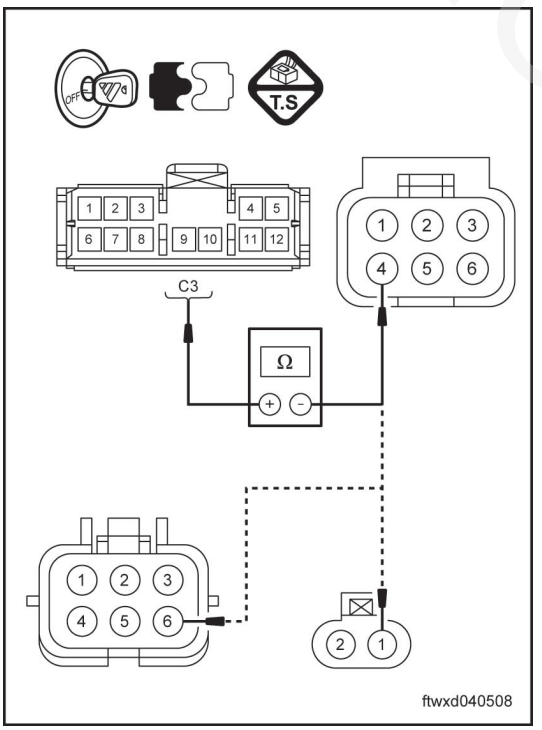
(d) Disconnect the left rear combination lamp connector B010.

(e) Disconnect the right rear combination lamp connector B005.



(f) Disconnect the left front combination lamp connector A011.

(g) Disconnect the right front combination lamp connector A003.



(h) Measure the electrical resistance based on the value in the following form.

Measure the resistance as per the values given in the table below

Multimeter connection	Standard value
CO34(C3) - B007（1）	＜2 Ω
CO34(C3) - B008（1）	＜2 Ω
CO34(C3) - B006（6）	＜2 Ω
CO34(C3) - B010（6）	＜2 Ω
CO34(C3) - A003（4）	＜2 Ω
CO34(C3) - A011（4）	＜2 Ω

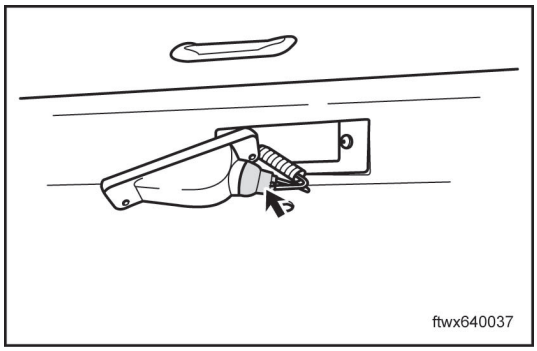
Check whether the result is normal?

Yes> go to step 7

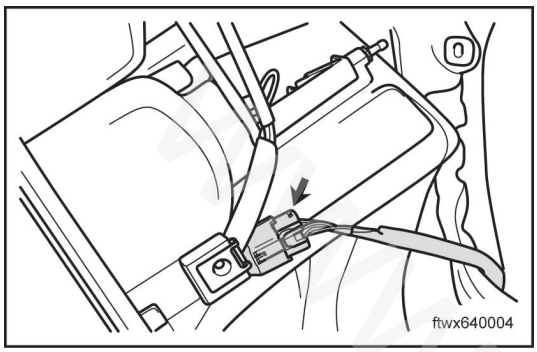
No > Maintenance or replace harness.

7 . Check the harness and connectors (license plate lamp / position light - ground)

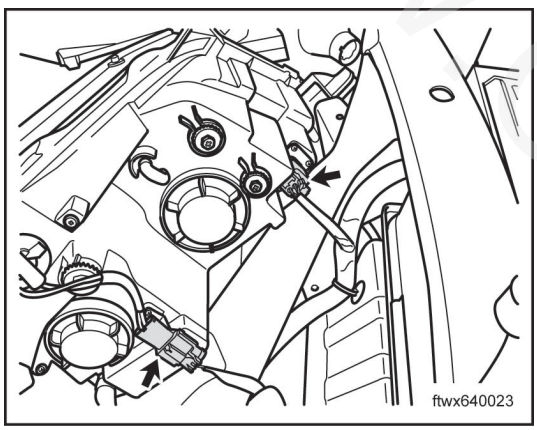
(a) Disconnect battery negative cable.



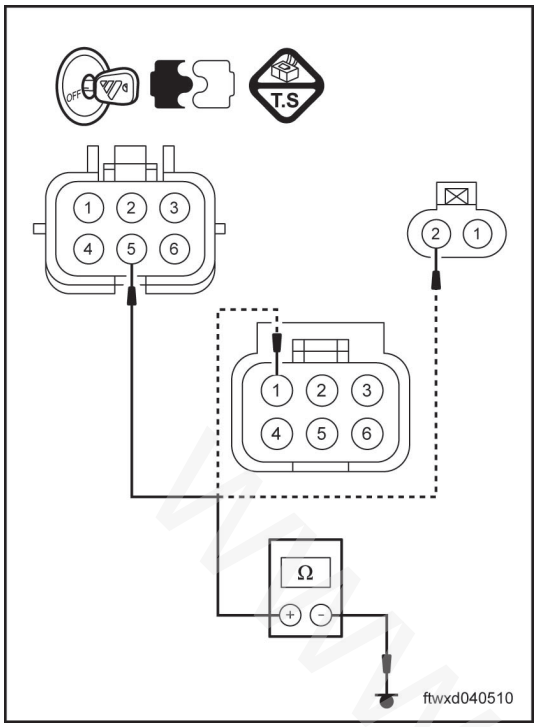
(b) Disconnect the license plate lamp connectors B007 and B008.



(c) Disconnect the left rear combination lamp connector B010.
(d) Disconnect the right rear combination lamp connector B005.



(e) Disconnect the left front combination lamp connector A011.
(f) Disconnect the right front combination lamp connector A003.



(g) Measure the electrical resistance based on the value in the following form.

Measure the resistance as per the values given in the table below

Multimeter connection	Standard value
B007 (2) - ground	< 2 Ω
B008 (2) - ground	< 2 Ω
C016 (1) ground	< 2 Ω
B010 (1) - Ground	< 2 Ω
A003 (5) - ground	< 2 Ω
A011 (5) - ground	< 2 Ω

Check whether the result is normal?

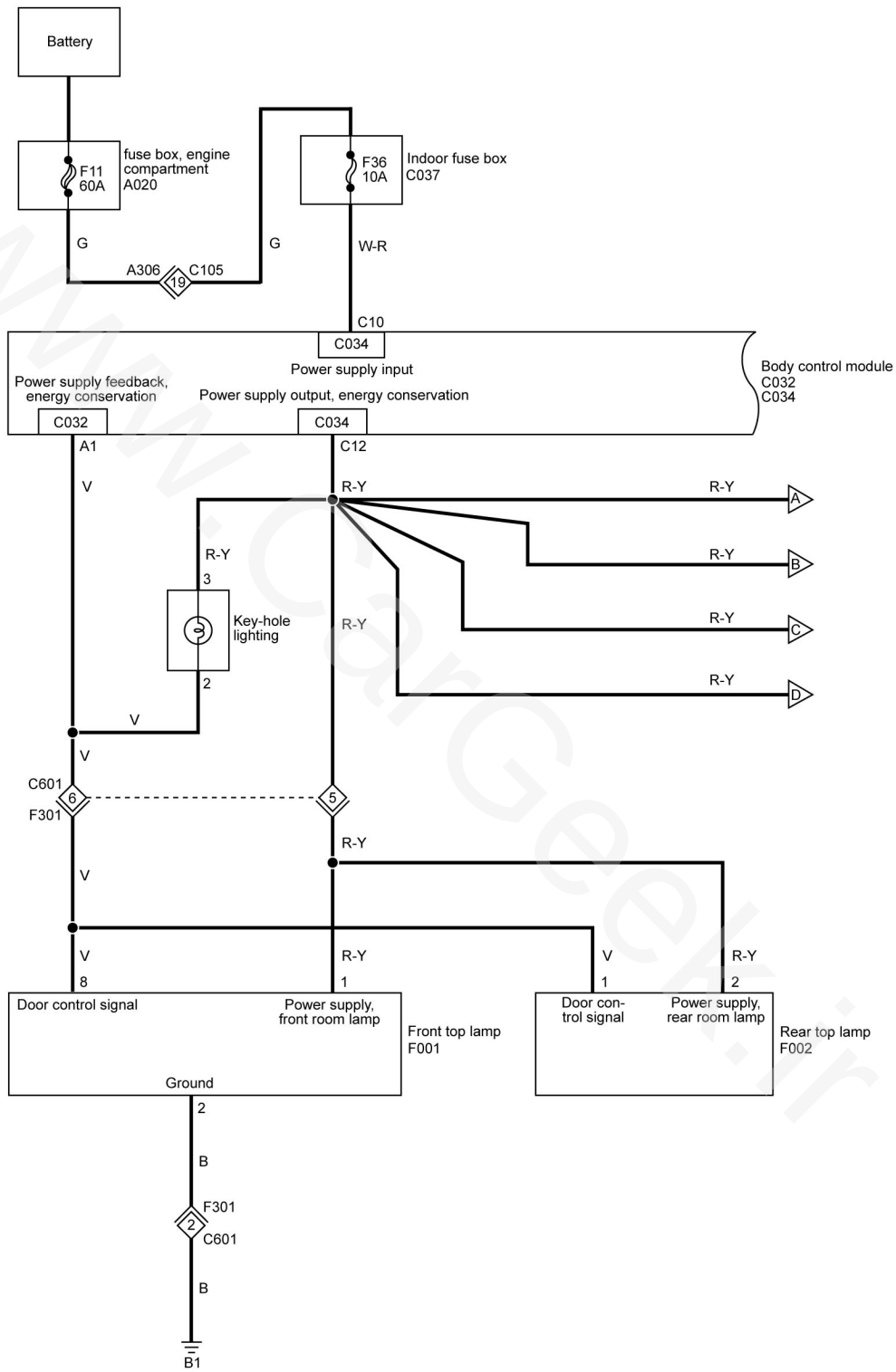
Yes> replace body controller

No > Maintenance or replace harness.

STEP LAMPS FAIL TO GO ON

Circuit diagram

Indoor lamp system



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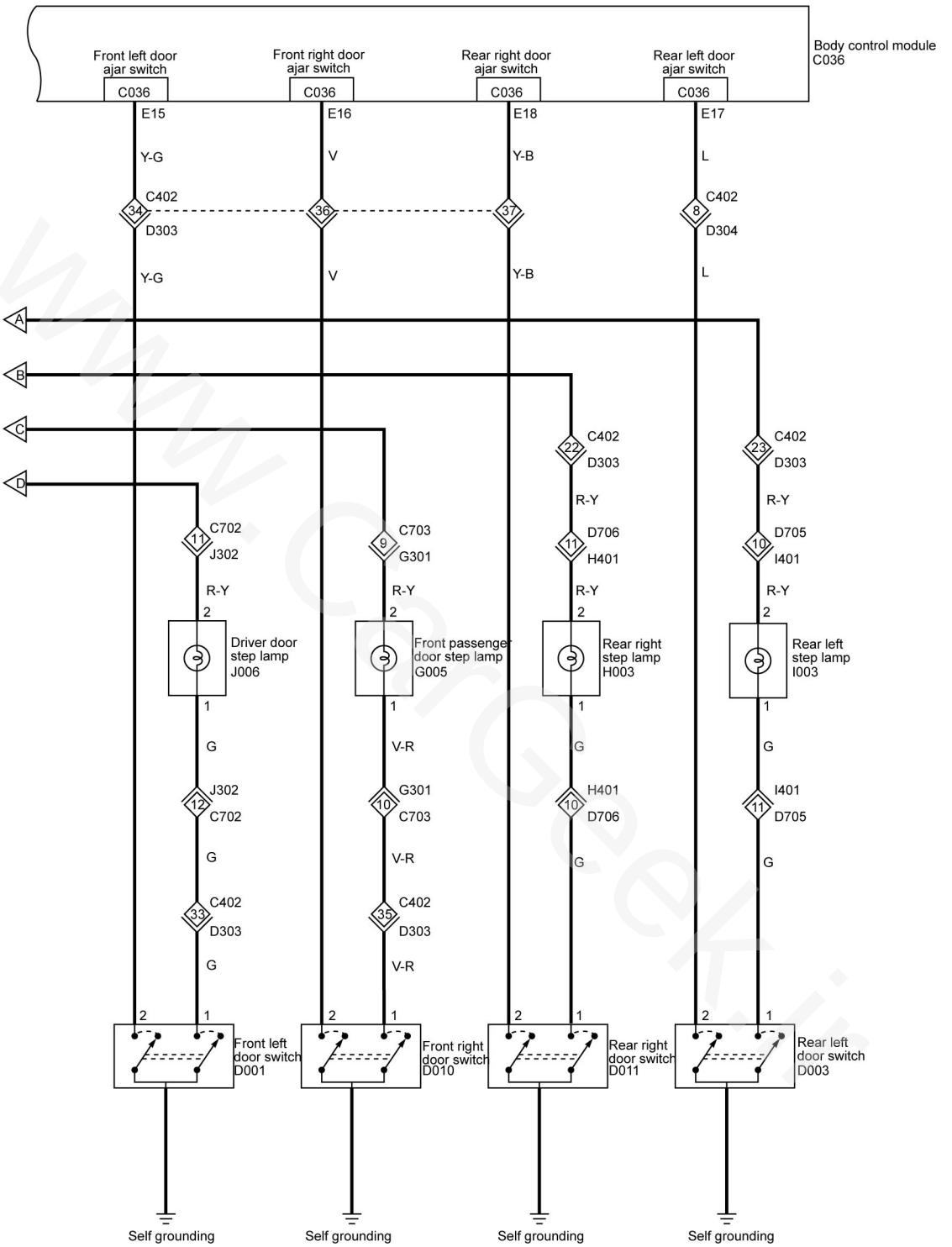

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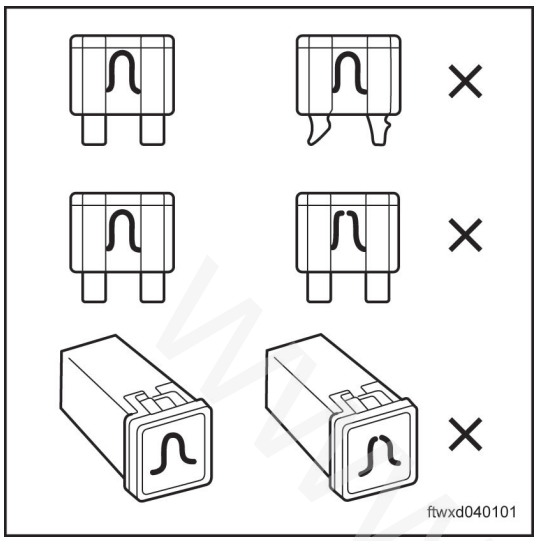
Diagnostic steps

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F36 (10 A) in the indoor fuse box (A037).

Check whether the result is normal?

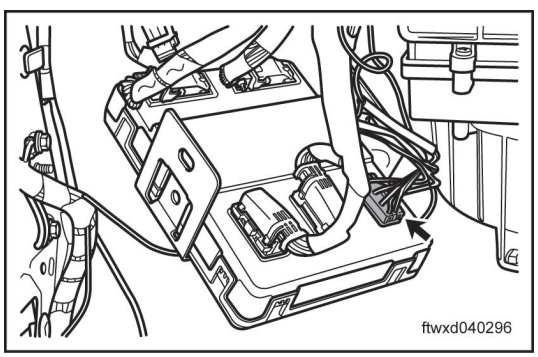
Yes> go to step 3

No > Go to the next step.

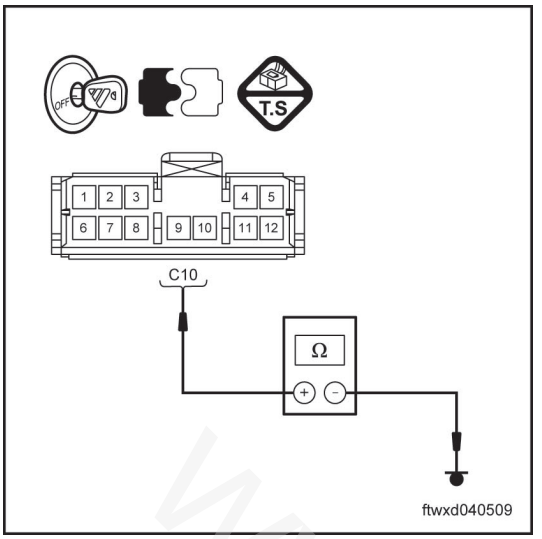
2 . Check the harness and connectors (vehicle body controller -ground)

(a) Disconnect battery negative cable.

(b) Unplug the fuse F36 (10 A) in the indoor fuse box (A037).



(c) Disconnect the connector C034 of vehicle body controller.



(d) Measure the electrical resistance based on the value in the following form.

Standard resistance (check whether there is short circuit)

Ground of multimeter	Standard value
C034 (C10) - ground	⩾1 MΩ

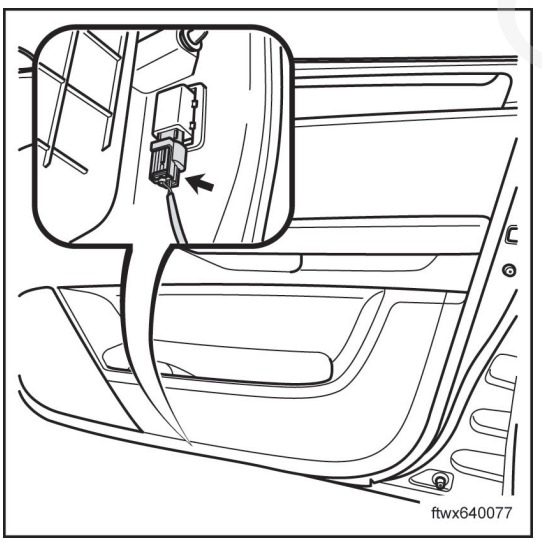
Check whether the result is normal?

Yes> Replace fuse

No > Maintenance or replace harness.

3 . Check the step lamps.

(a) Disconnect battery negative cable.



(b) Disconnect the left step lamp connector J006.

(c) Replace the step lamp assembly.

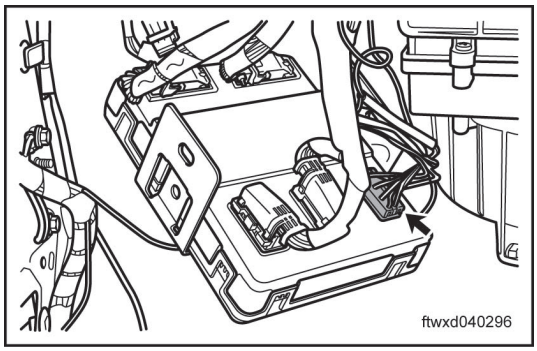
Check whether the step lamp is working properly.

Yes > Replace the step lamp.

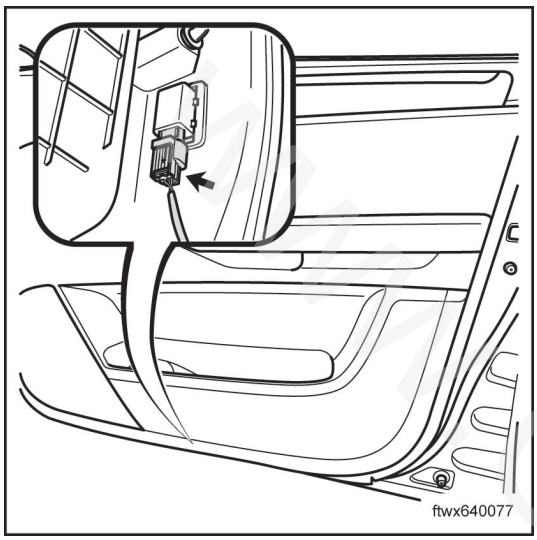
No> go to step 2

4 . Check the harness and connectors (vehicle body controller - step lamps)

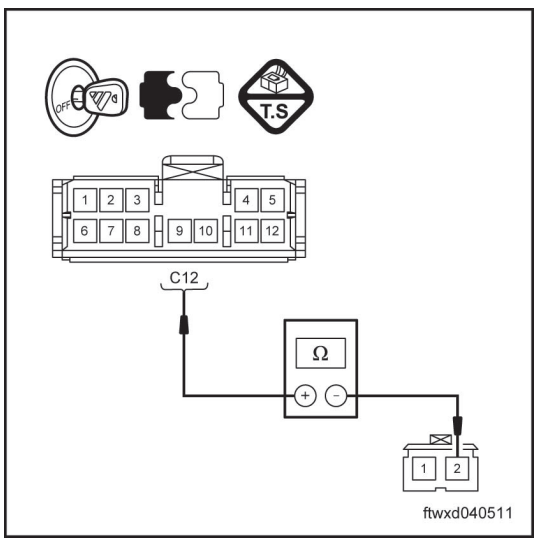
(a) Disconnect battery negative cable.



(b) Disconnect the connector C034 of vehicle body controller.



(c) Disconnect the left front step lamp connector J006.
(d) Disconnect the right front step lamp connector G005.
(e) Disconnect the left rear step lamp connector I003.
(f) Disconnect the right rear step lamp connector H003.



(g) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C034（C12） - J006（2）	＜2 Ω
C034（C12） - G005（2）	
C034（C12） - I003（2）	
C034（C12） - H003（2）	

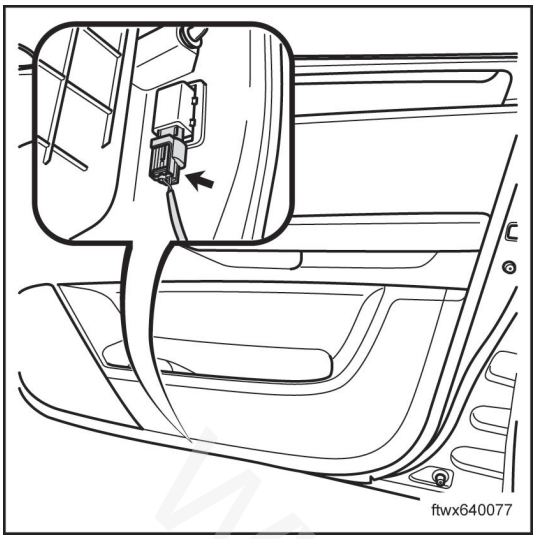
Check whether the result is normal?

Yes> go to step 5

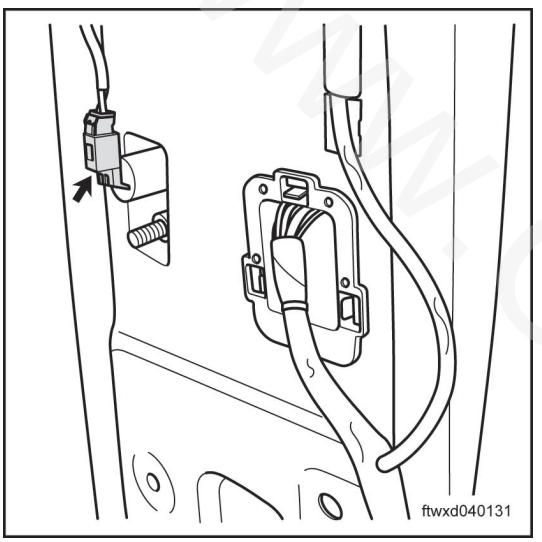
No > Maintenance or replace harness.

5 . Check the harness and connector (step lamps – door control switch)

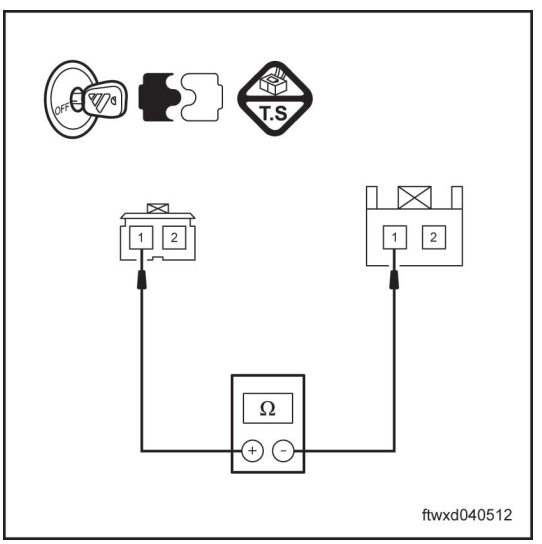
(a) Disconnect battery negative cable.



(b) Disconnect the left front step lamp connector J006.
(c) Disconnect the right front step lamp connector G005.
(d) Disconnect the left rear step lamp connector I003.
(e) Disconnect the right rear step lamp connector H003.



(f) Disconnect the left front door switch connector D001.
(g) Disconnect the right front door switch connector D010.
(h) Disconnect the left rear door switch connector D011.
(i) Disconnect the right rear door switch connector D003.



(j) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

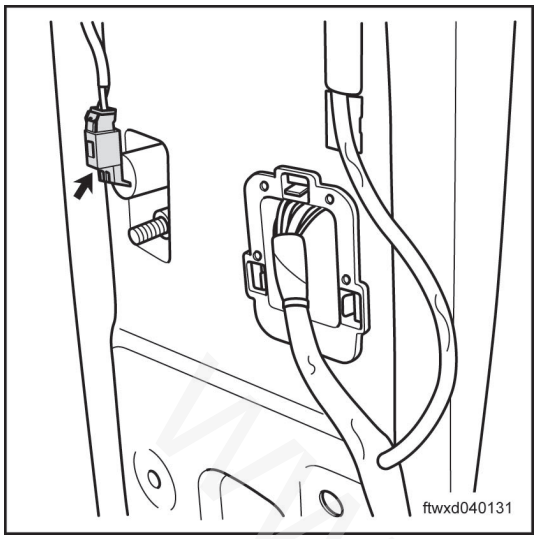
Multimeter connection	Standard value
J006（1） - D001（1）	＜2 Ω
I003（1） - D003（1）	
G005（1） - D010（1）	
H003（1） - D011（1）	

Check whether the result is normal?

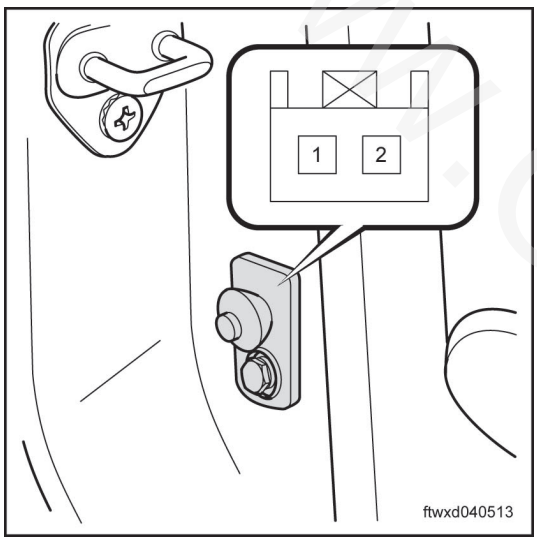
Yes > Replace the door switch and go to step 5.

No > Maintenance or replace harness.

6 . Check the door control switch



(a) Disconnect the door control switch connector.



(b) Check the door control switch

Standard voltage

Conditions	Multimeter connection stitch	Specified value
Door closed	1 - Ground	< 2 Ω
Door opened	1 - Ground	Cut-off

Check whether the result is normal?

Yes> replace body controller

No > Replace the door control switch.

ASSEMBLY INSTRUMENT

PRECAUTION

1 . Disconnect power supply

(a) When disassembling or installing any electric unit, or touching the exposed electrical terminal with tools or devices, disconnect the negative battery cable firstly, to prevent vehicle damage or personal injury.

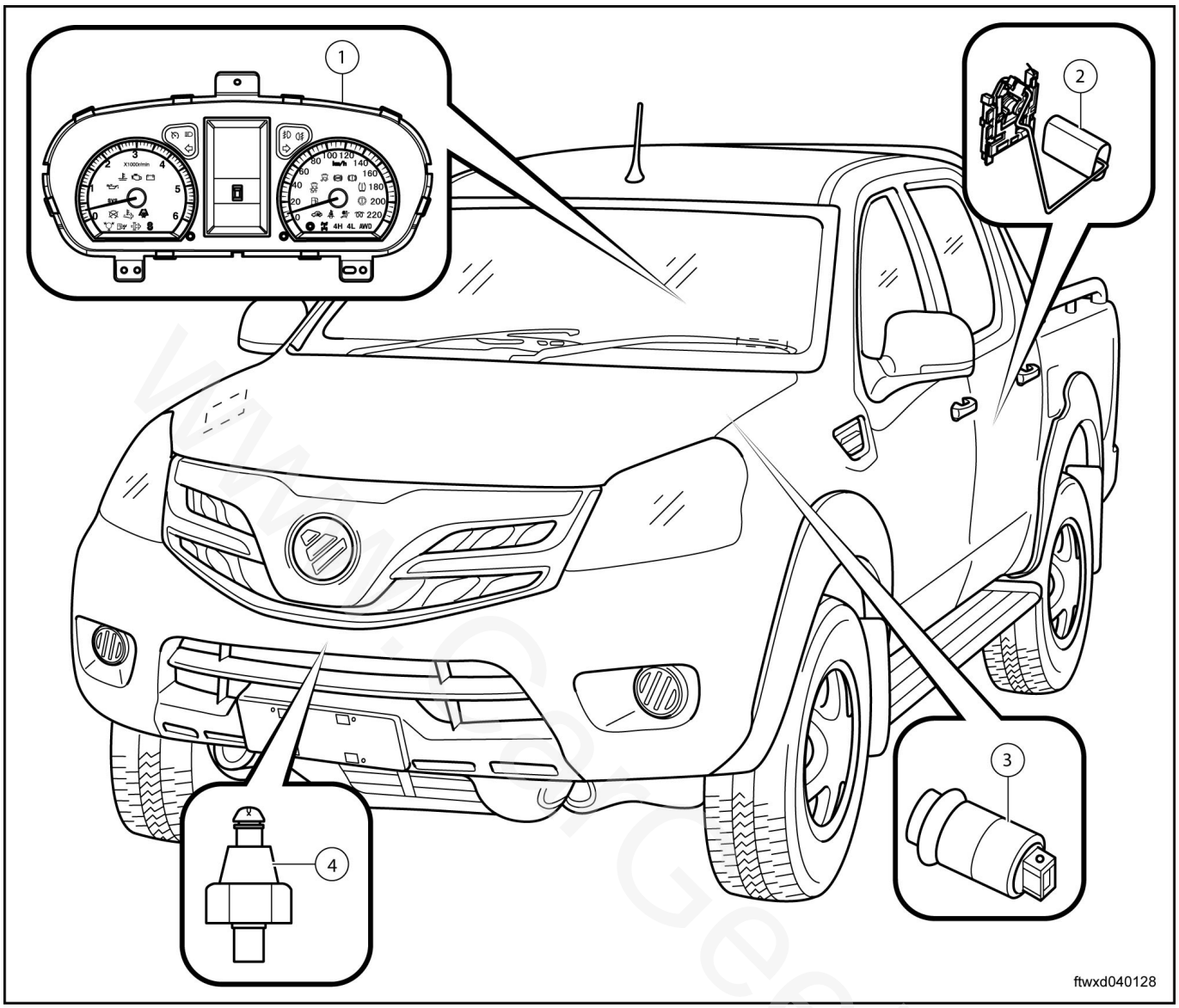
(b) During the operation, turn off the ignition if not otherwise specified.

(c) When the ignition is switched on, if the power supply stops in the combination instrument, all indicators will stay where they are at the moment of outage. When the power supply is restored, turn off the ignition. The combination instrument will be energized and perform a self test firstly, before the indicators show the current measurement.

2 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

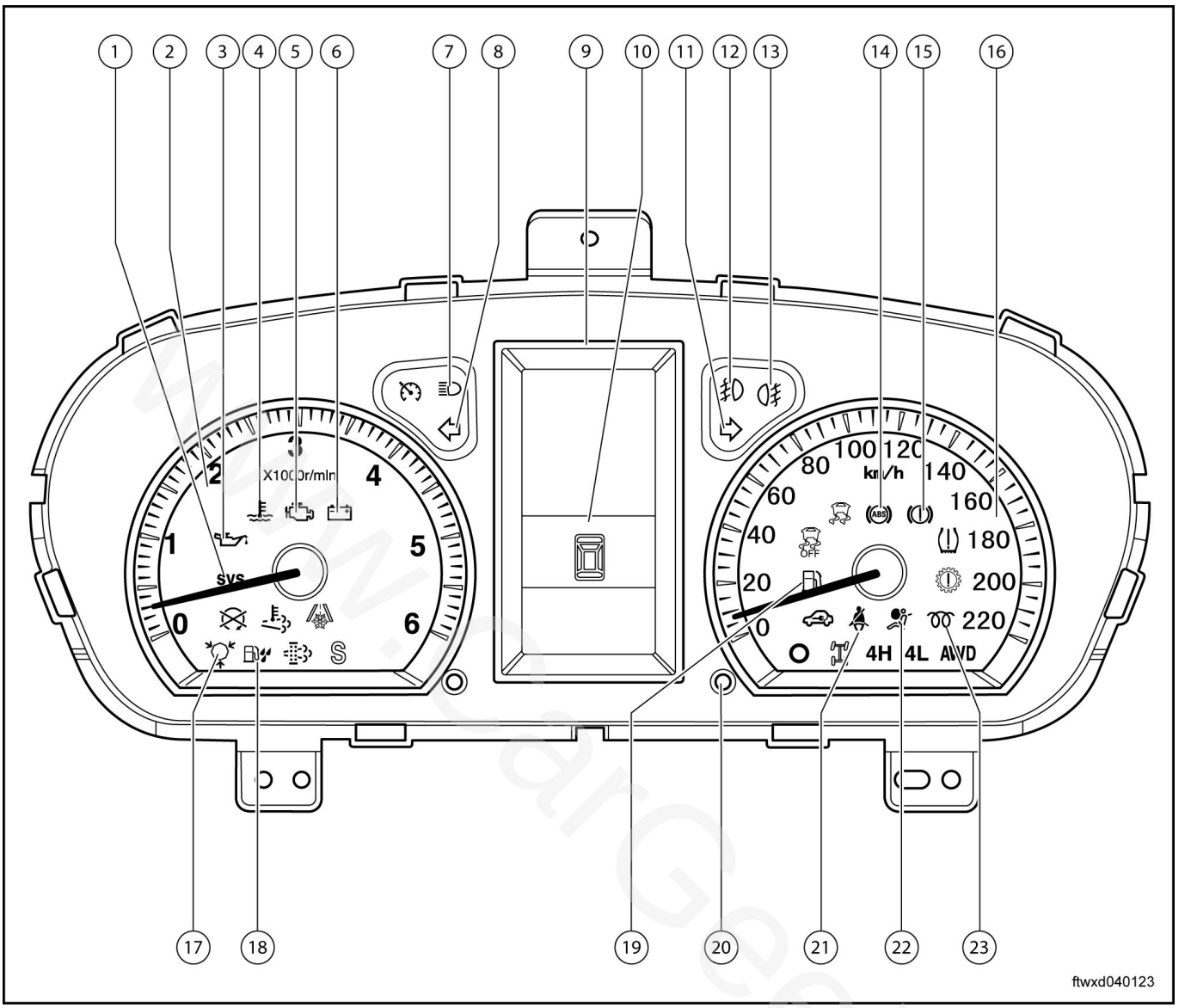
COMPONENTS DRAWING



1	Assembly instrument
2	Fuel sensor

3	Speedometer sensor
4	Oil pressure alarm switch (4G69 gas engine)

INSTRUMENT DESCRIPTION



Instrument gauge

Sequence number	Item	Description
16	Speedometer	It may indicate the current vehicle speed as per the pulse signals received from the vehicle speed sensor.
2	Tachometer	It may indicate the engine speed as per the signals received from ECM.

Warning / indicator lamp

Sequence number	Item	Description
22	SRS alarm lamp	The air bag module may light the air bag alarm indicator lamp when the air bag develops a fault.
3	Oil pressure indicator lamp	It may light the oil pressure indicator lamp as per the signals received from the oil pressure alarm switch.

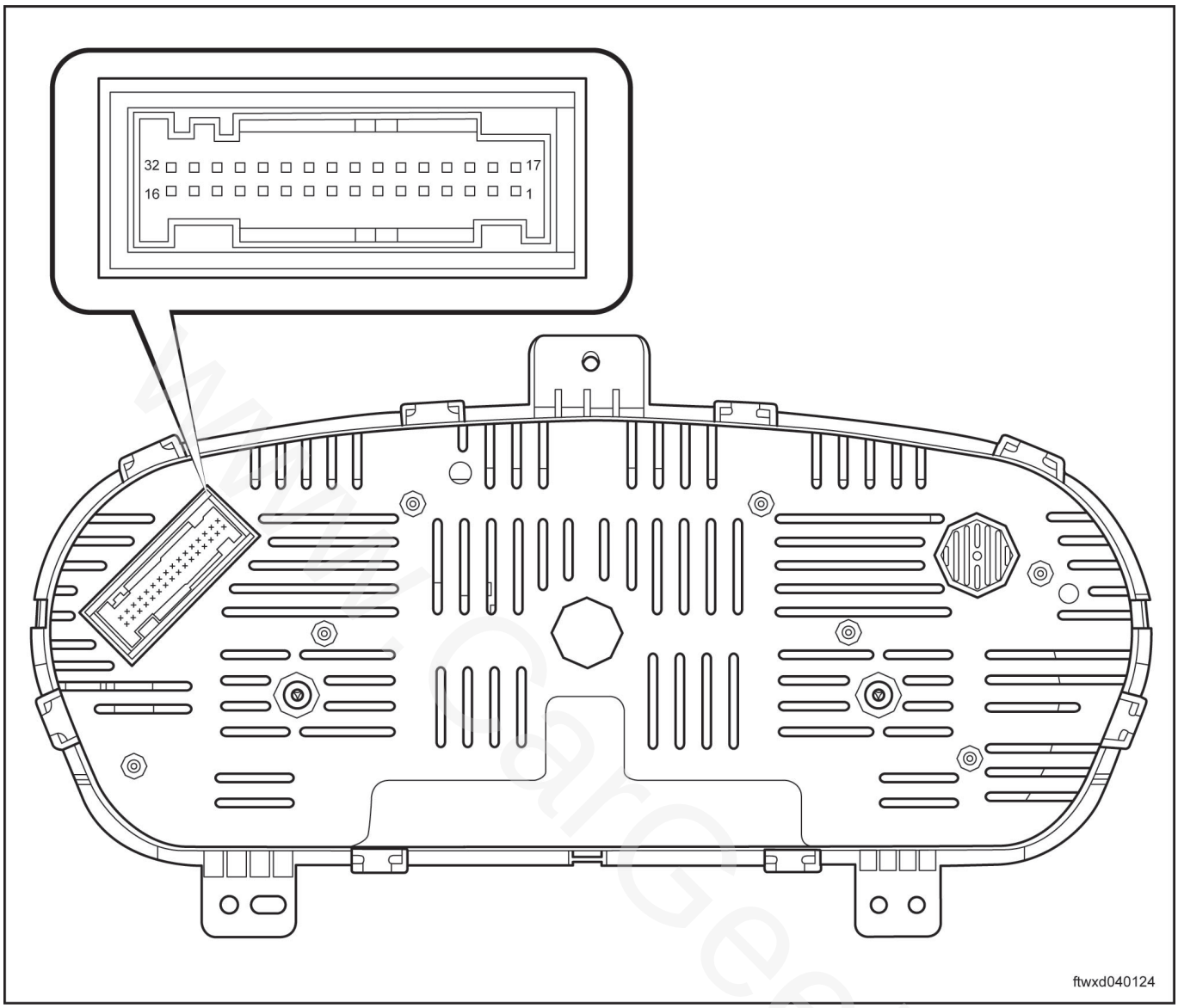
Sequence number	Item	Description
14	ABS fault indicating lamp	When ABS system develops a fault, the ABS control unit may light the ABS fault indicating lamp.
5	Engine fault indicating lamp	ECM may light the engine fault indicating lamp when the engine electric control system develops a fault.
8	Left turning signal and hazard warning indicator lamp	The left turning signal and hazard warning indicator lamp may be lit when the turn light switch or hazard warning switch are turned on.
11	Right turning signal and hazard warning indicator lamp	The left turning signal and hazard warning indicator lamp may be lit when the turn light switch or hazard warning switch are turned on.
1	SVS alarm lamp (gasoline vehicle)	When engine ECM detects a common fault of the system and the diagnosis switch is set to the off position, the lamp may be lit and kept constantly on before the fault is eliminated.
20	Reset button	It may be used to set and rest the liquid crystal display signals.
13	Rear fog lamp indicator lamp	The rear fog lamp indicator lamp may be lit as per the signals received from 3-in-1 controller when the rear fog lamp switch is turned on.
21	Seat belt indicator lamp	The seat belt indicator lamp may be lit as per the signal received from the seat belt non-fastening alarm switch.
15	Brake fault alarm lamp	The parking brake indicator lamp may be lit when the parking brake switch is turned on or when the level of brake fluid is lower than the minimum scale marks and the brake fault low alarm switch is set to its on position.
17	Vacuity alarm indicator lamp (diesel vehicle)	The vacuity alarm indicator lamp may be lit when the vacuum power take off switch is turned on.
10	Door non-closing alarm lamp	The door non-closing alarm lamp may be lit when the door non-closing alarm switch is turned on.
18	Water deposit indicator lamp (diesel vehicle)	When the water deposit inside fuel water separator in the diesel oil filter element reaches a certain amount, the water deposit switch is set to its on position, and the water deposit is lit.
23	Preheating indicator lamp (diesel vehicle)	When the engine temperature is lower than the preset temperature, the engine control unit may issue a command to preheat the engine intake system and light the preheating indicator lamp simultaneously.
19	Fuel alarm lamp	When the level of fuel inside the fuel tank is lower than the setting dial, the fuel alarm switch is set to its on position, and the fuel alarm lamp is lit.
6	Alternator indicator lamp	When charging system develops a fault, the alternator indicator may be lit.
7	High-beam indicator lamp	The high beam indicator lamp may be lit as per the signals received from high beam relay when the driving lights are turned on.
12	Front fog lamp indicator lamp	The front fog lamp indicator lamp may be lit as per the signals received from front fog lamp relay when the front fog lamp switch is turned on.

Sequence number	Item	Description
4	Water temperature alarm lamp	When water temperature is ⩾ 102 ℃ (diesel engine) or ⩾ 110 ℃ (gas-engine), or coolant temperature sensor develops a fault or water level alarm switch is closed or develops a fault, the combination instrument may light the water temperature alarm lamp.

LCD

Sequence number	Item	Description
9	Display screen	Contents displayed: transient fuel consumption graduation apparatus, endurance mileage, average fuel consumption, total mileage, subtotal mileage, maintenance prompt, tire pressure, tire temperature, door status, character alarm prompt, fuel gauge, and water thermometer.

INSTRUMENT TERMINAL



Terminal no.		Connection rod color	Description
C013	1	Blue-yellow	CAN L
	2		
	3	Black	Battery ground
	4		Vehicle speed output (re-served)
	5	Pink - black	Battery +
	6		
	7	Black - blue	Sensor earth
	8	Blue - black	Vehicle speed signal
	9		
	10		
	11	Brown - white	Oil pressure alarm switch

Terminal no.		Connection rod color	Description
	12		
	13	Green-black	Front-axle engaging/disengaging operating switch
	14	Grey	Brake liquid level alarm switch
	15		
	16		Digital signal input reserved 2
	17	Red-white	CAN H
	18		
	19	Pink	Ignition switch (ON position)
	20	Yellow	Vacuum alarm switch
	21		
	22	Red-blue	Fuel level signal
	23	Black-Red	Alternator D+ terminal
	24		
	25	Black-Red	Driver seat belt switch
	26	Yellow-black	Passenger seat belt switch
	27		K line diagnosis
	28		
	29		Digital signal input reserved 1
	30		
	31	White - black	Parking brake switch
	32	Orange -violet	Vehicle-body anti-theft

BASIC INSPECTION

⚠ **CAUTION**

Before basic inspection, the engine must reach its operating temperature. Trial driving must be conducted by 2 persons or more.

Steps	Inspection contents		Measures
1	**Check the battery** • Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	No> go to step 2
		No?	Charge or replace the battery. Refer to "Chapter 20A, start and charge- battery"
2	**Check the speedometer** • Connect a diagnosis instrument, and select vehicle speed. • Observe the readings indicated by the speedometer when the vehicle speed is 20~100 Km/h, 120Km/h, and 140Km/h. • The errors shall be +5, +6, and +7Km/h respectively. • The index hand shall be free of pulsation when uniform speed or uniform acceleration is selected. ⚠ **CAUTION** **Either tire wear, over-inflation or under inflation may lead to errors.** **Check whether the result is normal?**	Yes	No> go to step 3
		No?	to Defect Phenomenon Form
3	**Check the oil pressure indicator lamp** • Ignition Switch: ON. • Oil pressure indicator lamp shall be lit • When the engine is started up, oil pressure indicator lamp shall go out. **Check whether the result is normal?**	Yes	No> go to step 4
		No?	to Defect Phenomenon Form
4	**Check the fuel gauge** • Ignition switch: ON (ACC). • fuel gage shall display the current fuel level. **Check whether the result is normal?**	Yes	Completed
		No?	to Defect Phenomenon Form

DEFECT PHENOMENON FORM

Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Entire system

Defect phenomenon	Suspect Area	Reference
The entire combination instrument does not work	1. Power supply, ground wire	Chapter 04 Diagnosis - combination instrument, entire combination instrument does not work
	2. Combination instrument itself	Chapter 04 Diagnosis - combination instrument, entire combination instrument does not work

Instrument gauge

Defect phenomenon	Suspect Area	Reference
Speedometer defects	1. Vehicle speed sensor	Chapter 4. Diagnosis - combination instrument, speedometer fault
	2. Speedometer circuit	Chapter 4. Diagnosis - combination instrument, speedometer fault
	3. Speedometer itself	Chapter 4. Diagnosis - combination instrument, speedometer fault
Fuel gage faults	1. Fuel sensor	Chapter 04 Diagnosis - combination instrument, fuel gauge fault
	2. Fuel gauge circuit	Chapter 04 Diagnosis - combination instrument, fuel gauge fault
	3. Fuel gage itself	Chapter 04 Diagnosis - combination instrument, fuel gauge fault

Warning lamp

Defect phenomenon	Suspect Area	Reference
Brake fault alarm lamp fails to go on/normally on	1. Brake fault alarm switch	Chapter 04 Diagnosis - combination instrument, brake fault alarm lamp fails to go on/normally on
	2. Brake fault alarm lamp circuit	Chapter 04 Diagnosis - combination instrument, brake fault alarm lamp fails to go on/normally on
	3. Combination instrument assembly	Chapter 04 Diagnosis - combination instrument, brake fault alarm lamp fails to go on/normally on
Water temperature alarm lamp fails to go on/normally on	1. Coolant temperature sensor	Chapter 04 Diagnosis - combination instrument, water temperature alarm lamp fails to go on/normally on
	2. Water level alarm switch	Chapter 04 Diagnosis - combination instrument, water temperature alarm lamp fails to go on/normally on

Defect phenomenon	Suspect Area	Reference
	3. Water temperature alarm lamp circuit	Chapter 04 Diagnosis - combination instrument, water temperature alarm lamp fails to go on/normally on
	4. Combination instrument assembly	Chapter 04 Diagnosis - combination instrument, water temperature alarm lamp fails to go on/normally on

Indicating lamp

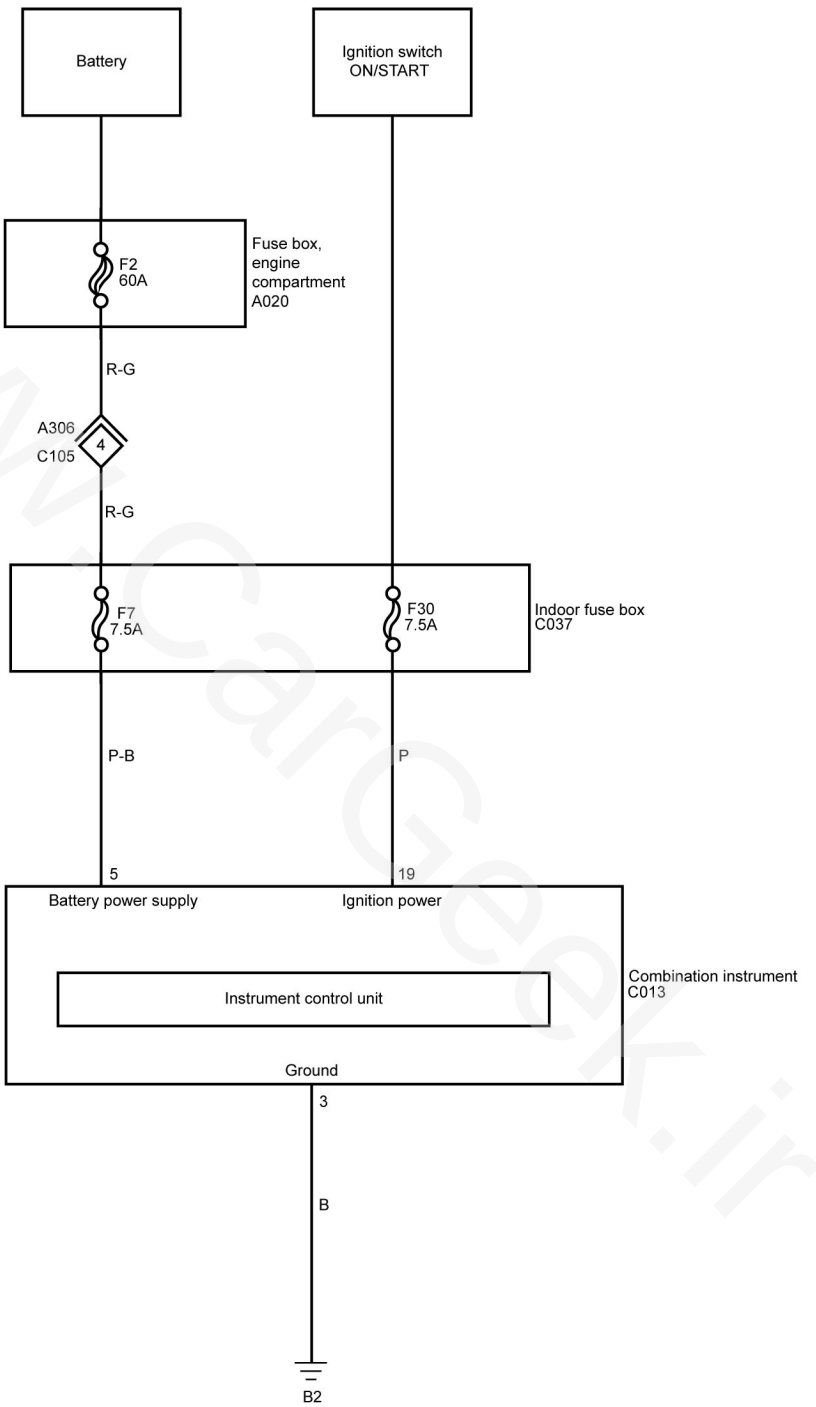
Defect phenomenon	Suspect Area	Reference
Oil pressure indicator lamp fails to go on/normally on	1. Oil pressure switch	Chapter 04 Diagnosis - combination instrument, oil pressure indicator lamp fails to go on/normally on
	2. Oil pressure indicating lamp circuit	Chapter 04 Diagnosis - combination instrument, oil pressure indicator lamp fails to go on/normally on
	3. Combination instrument assembly	Chapter 04 Diagnosis - combination instrument, oil pressure indicator lamp fails to go on/normally on
Vacuum alarm indicator lamp fails to go on/normally on	1. Fuse	Chapter 04 Diagnosis - combination instrument, vacuum alarm indicator lamp fails to go on/normally on
	2. Vacuity alarm	Chapter 04 Diagnosis - combination instrument, vacuum alarm indicator lamp fails to go on/normally on
	3. Combination instrument assembly	Chapter 04 Diagnosis - combination instrument, vacuum alarm indicator lamp fails to go on/normally on

LCD

Defect phenomenon	Suspect Area	Reference
No mileage display or blurry display	1. LCD	Chapter 83 Dashboard/instruments - combination instrument, replacement

THE ENTIRE COMBINATION INSTRUMENT DOES NOT WORK

Circuit diagram

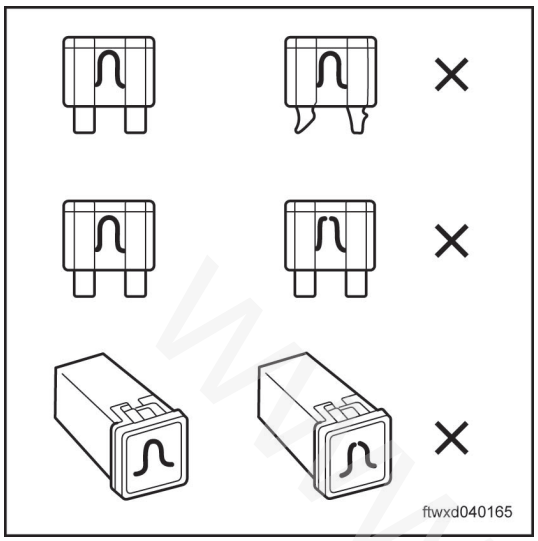


ftwxd040620

Diagnostic steps

1 . Check fuse

(a) Ignition Switch: ON.



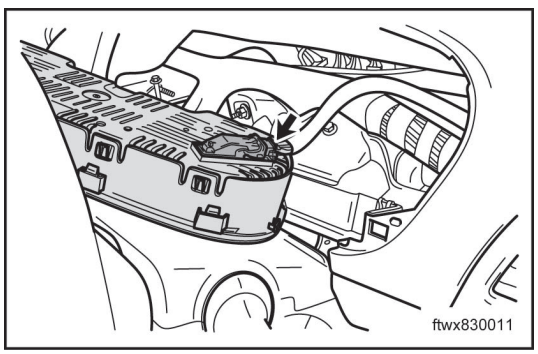
(b) Check whether the fuse of the interior fuse box: F7 (7.5A), F30 (7.5A) is fusing or not.

Check whether the result is normal?

Yes> go to step 2

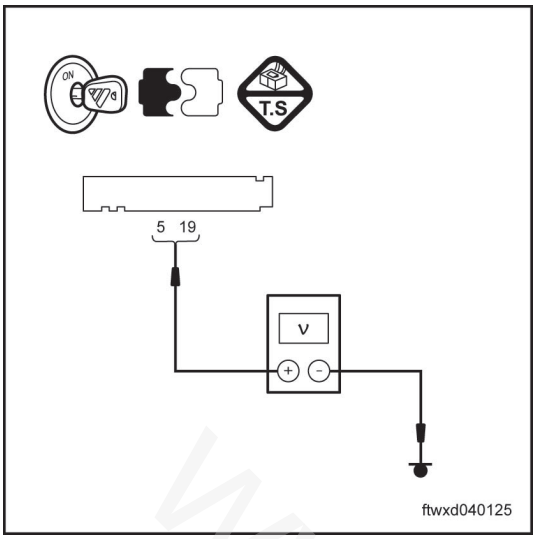
No> replace fuse

2 . Check the power circuit of combination instrument



(a) Disconnect assembly instrument C013 connector

(b) Ignition Switch: ON.



(c) Use a multimeter to measure the voltage between pins 5 and 19 of connector C013 of the combination instrument C013 and the ground.

Standard voltage

Multimeter connection	Standard value
C013 (5) -ground	Battery voltage
C013 (19) -ground	

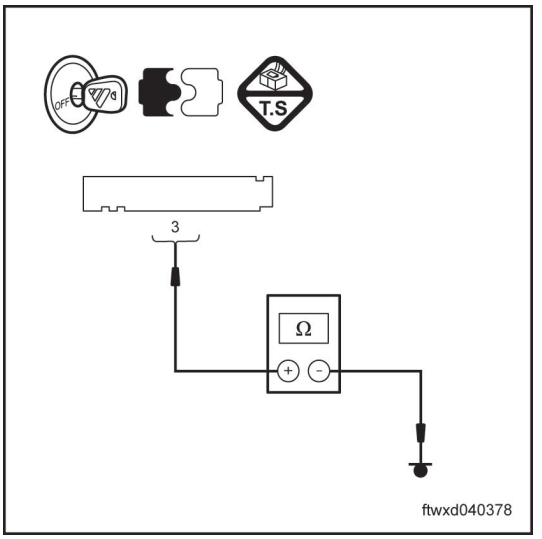
Check whether the result is normal?

Yes> go to step 3

No > If battery voltage is unavailable in pin 5 of connector C013 of combination instrument, repair the open circuit of the circuit between F7 (7.5A) and pin 5 of connector C013 of the combination instrument. If battery voltage is unavailable in pin 19 of connector C013 of combination instrument, repair the open circuit of the circuit between F30 (7.5A) and pin 19 of connector C013 of the combination instrument.

3 . Check the ground circuit of combination instrument

(a) Ignition Switch: OFF.



(b) Use a multimeter to measure the resistance between pins 3 of connector C013 of the combination instrument and the ground.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C013 (3) -ground	⩽ 2 Ω

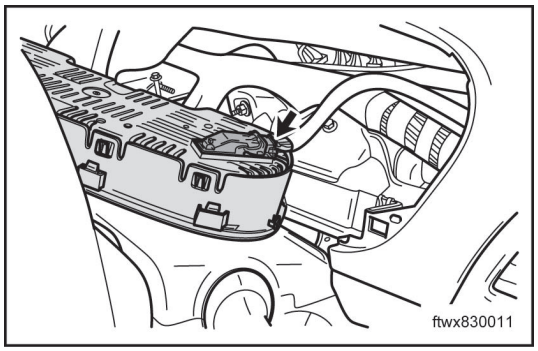
Check whether the result is normal?

Yes> replace combination instrument assembly.

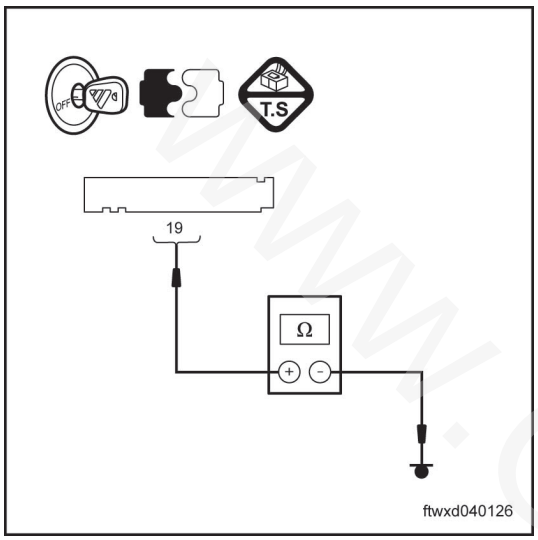
No > Repair the circuit between pin 3 of connector C013 of combination instrument and the ground.

4 . Check the power-supply short circuit of combination instrument

(a) Ignition Switch: OFF.



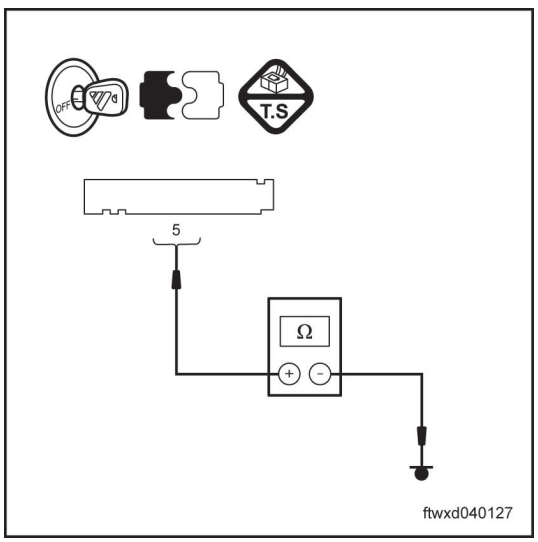
(b) Disconnect the connector C013 of combination instrument.



(c) Use a multimeter to measure the resistance between pin 19 of connector C013 of combination instrument and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C013 (19) -ground	⩾ 1 MΩ



(d) Use a multimeter to measure the resistance between pins 5 of connector C013 of the combination instrument and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
C013 (5) -ground	⩾ 1 MΩ

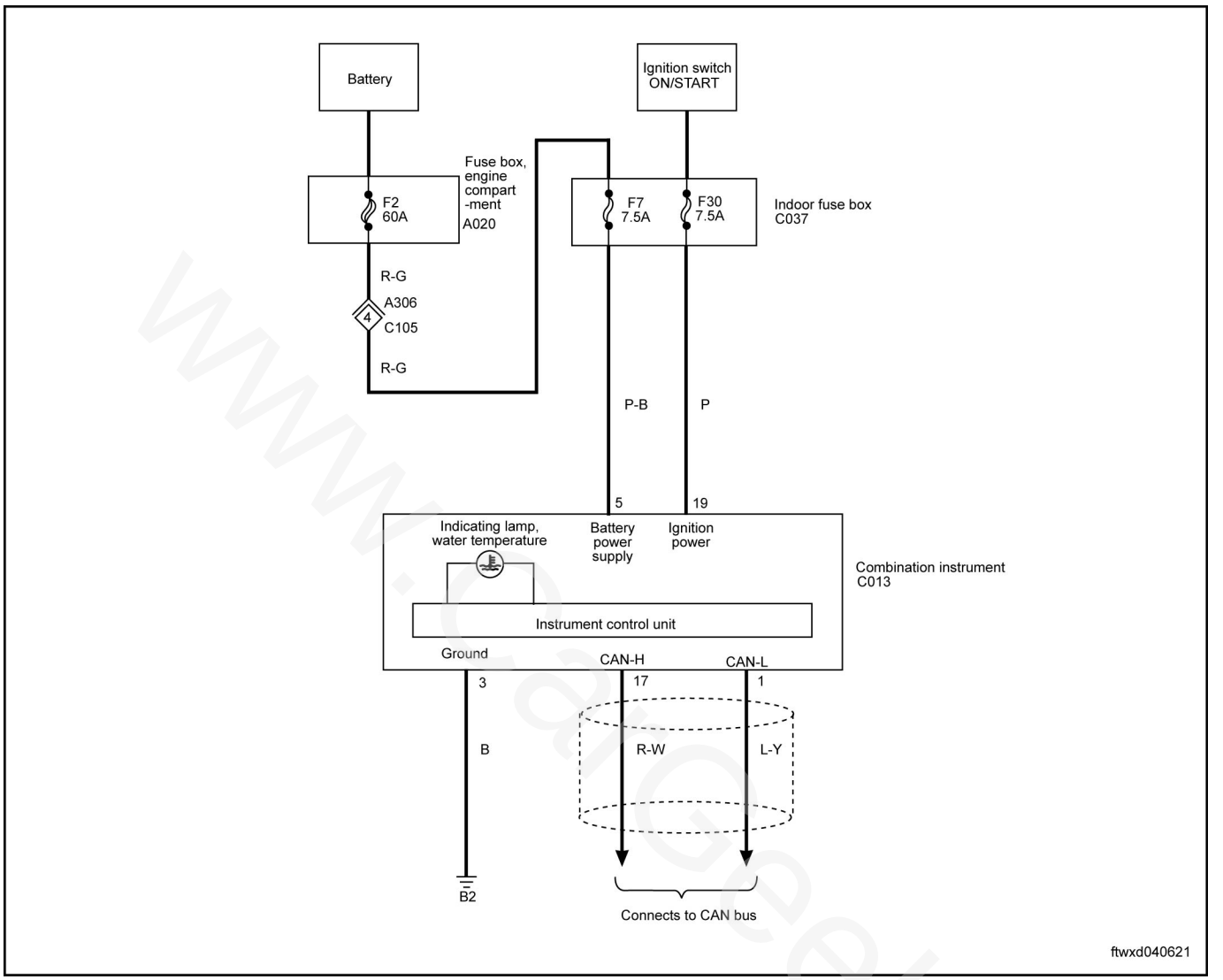
Check whether the result is normal?

Yes> replace combination instrument assembly.

No > Repair the to-ground short circuit of the circuit between fuse F30 (7.5A) and pin 19 of connector C013 of combination instrument; Repair the to-ground short circuit of the circuit between fuse F7 (7.5A) and pin 5 of connector C013 of combination instrument

WATER TEMPERATURE ALARM LAMP FAILS TO GO ON/NORMALLY ON

Circuit diagram



Diagnostic steps

- When water temperature is too low or resistance of engine coolant temperature sensor is ⩾ 5K Ω, the water temperature alarm lamp fails to go on.
- When engine coolant temperature sensor does not work or Engine Coolant Temperature Sensor is open-circuited, the water temperature alarm lamp fails to go on.
- When coolant level is lower than the standard lowest graduation, the water temperature alarm lamp will be constantly on.
- When water temperature is too high (water temperature is ⩾ 102 ℃ (diesel engine) or ⩾ 110 ℃ (gas engine)), water temperature alarm lamp will flicker.
- When the Engine Coolant Temperature Sensor is short-circuited, the water temperature alarm lamp will flicker.
- When ignition switch is set to ON, water temperature alarm lamp will go on for about 3 seconds and then normally on.
- Verify that the coolant level is within the standard graduation.
- Verify that the water temperature of engine is normal.

- **Ignition Switch: ON.**

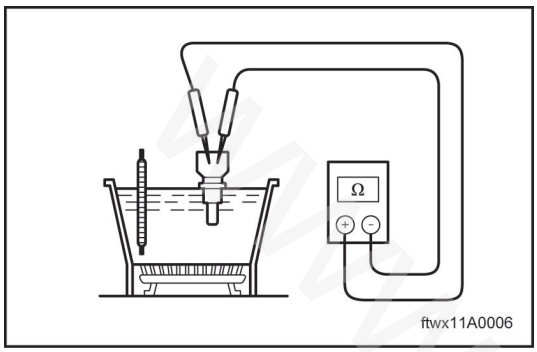
1 . Check the coolant temperature sensor

(a) Ignition Switch: OFF.

(b) Dismount the coolant temperature sensor.

⚠ **CAUTION**

Engine coolant temperature sensor shall be dismounted in cold vehicle status (or water temperature ≤ 40℃).



(c) Use a multimeter to measure the resistance of engine coolant temperature sensor at different water temperature, and its reference value shall conform to the items listed in the table below.

Temperature (℃)	**50**	**85**	**110**	**115**
Resistance (Ω)	226 ± 35	64 ± 8	28	26.4 ± 2

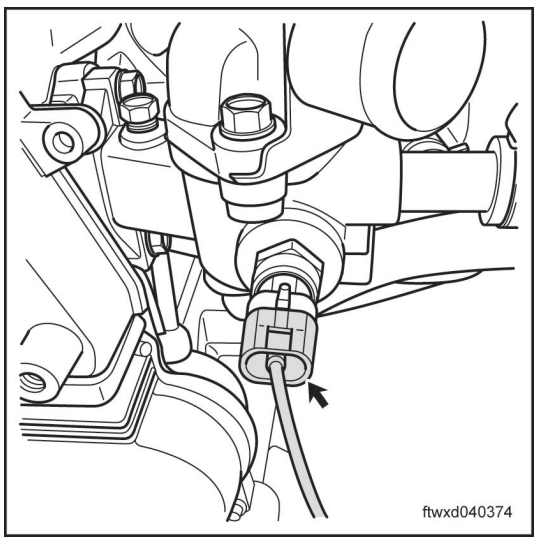
Check whether the result is normal?

Yes> go to step 2

No > Replace the coolant temperature sensor

2 . Check the signal circuit of engine coolant temperature sensor.

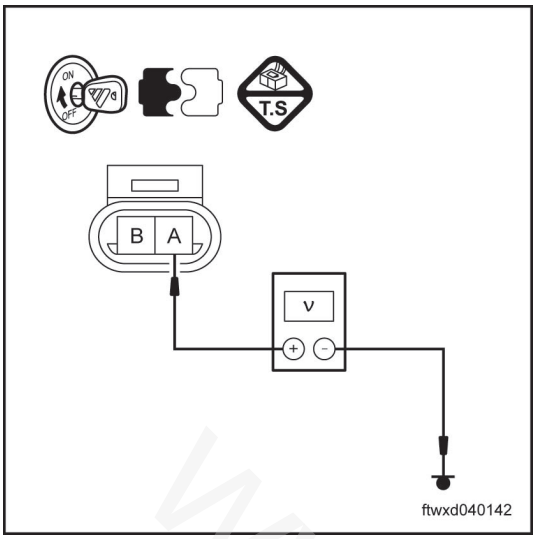
(a) Ignition Switch: OFF.



(b) Disconnect the connector E016 of engine coolant temperature sensor. (gasoline vehicle)

(c) Disconnect the connector E016 of engine coolant temperature sensor. (diesel vehicle)

(d) Ignition Switch: ON.



(e) Use a multimeter to measure the voltage between pin A of connector of engine coolant temperature sensor and ground.

Standard voltage

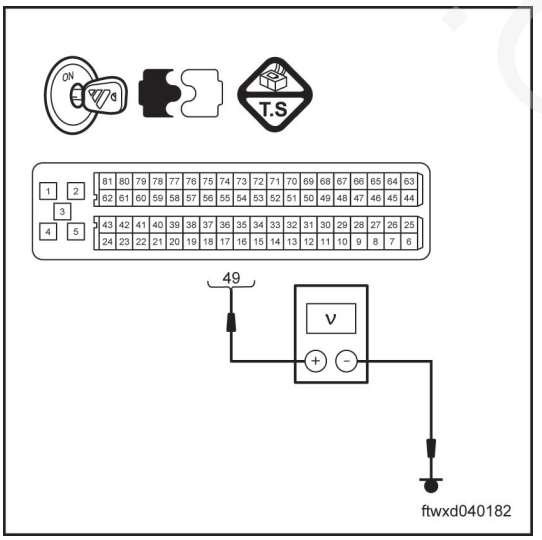
Multimeter connection	Standard value
E016 (A) - Ground	5 V

Check whether the result is normal?

Yes> go to step 4

No> go to step 3

3 . Check the signal power supply of engine coolant temperature sensor.



(a) Use a multimeter to measure the voltage between pin 49 of connector E006 of engine control module and the ground.

Standard voltage

Multimeter connection	Standard value
E006 (49) -ground	5 V

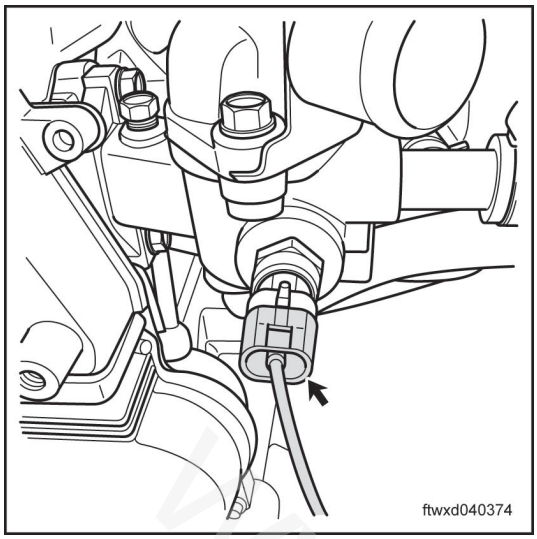
Check whether the result is normal?

Yes >Repair the opened signal circuit between pin 49 of connector E006 of engine control module and pin B of connector E016 of engine coolant temperature sensor.

No > Replace the engine control module.

4 . Check the ground circuit of engine coolant temperature sensor.

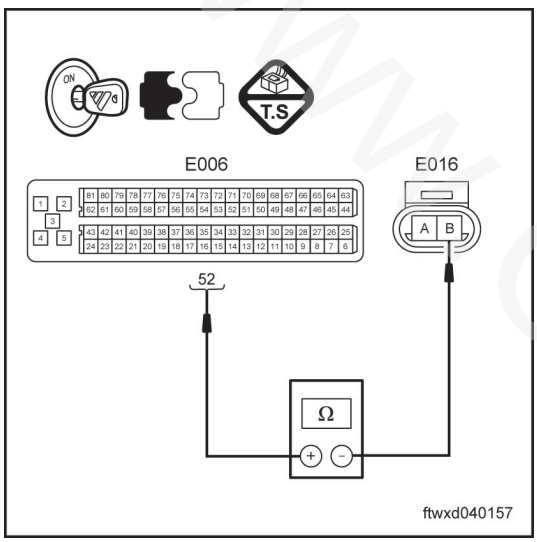
(a) Ignition Switch: OFF. a



(b) Disconnect the connector E016 of engine coolant temperature sensor. (gasoline vehicle)

(c) Disconnect the connector E016 of engine coolant temperature sensor. (diesel vehicle)

(d) Ignition Switch: ON.



(e) Use a multimeter to measure the resistance between pin B of connector E016 of engine coolant temperature sensor and pin 52 of connector E006 of engine control module.

Standard electrical resistance (check whether there existent an open circuit)

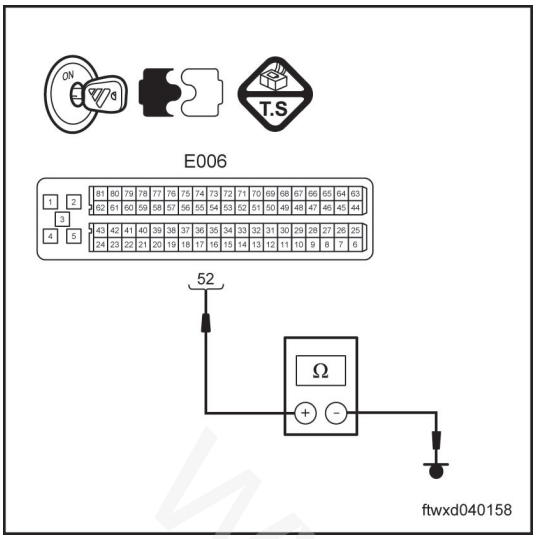
Multimeter connection	Standard value
E016(B) - E006(52）	⩽ 2 Ω

Check whether the result is normal?

Yes> go to step 5

No>Repair the open circuit between pin 52 of connector E006 of combination instrument and pin A of connector E016 of engine coolant temperature sensor.

5 . Check the ground of engine coolant temperature sensor.



(a) Use a multimeter to measure the resistance between pin 52 of connector E006 of engine control module and the ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
E006 (52) -ground	⩽ 2 Ω

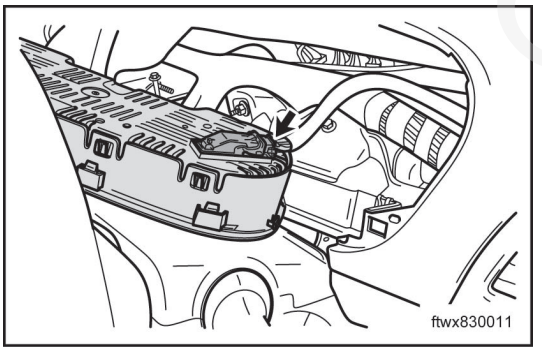
Check whether the result is normal?

Yes> go to step 6

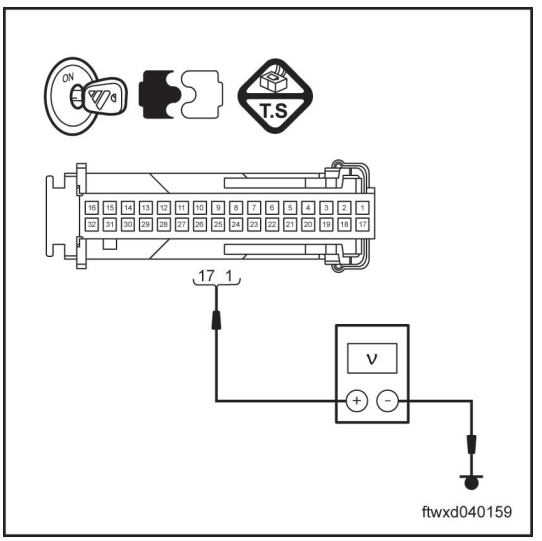
No > Replace the engine control module.

6 . Check the CAN bus circuit

(a) Ignition Switch: ON.



(b) Disconnect the connector C013 of combination instrument.



(c) Use a multimeter to measure the voltage between pins 17 and 1 of connector C013 of combination instrument and the ground.

Standard voltage

Multimeter connection	Standard value
C013 (17) -ground	12 V
C013 (1) -ground	1 V

Check whether the result is normal?

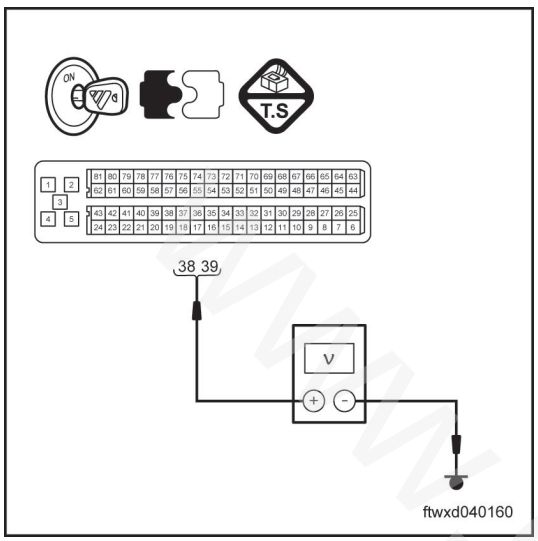
Yes > Replace the combination instrument.

No> go to step 7

7 . Check the output control circuit of engine control module

(a) Ignition Switch: ON.

(b) Disconnect the connector E006 of engine control module.



(c) Use a multimeter to measure the voltage between pins 38 and 39 of connector E006 of engine control module and the ground.

Standard voltage

Multimeter connection	Standard value
E006 (38) -ground	1 V
E006 (39) -ground	12 V

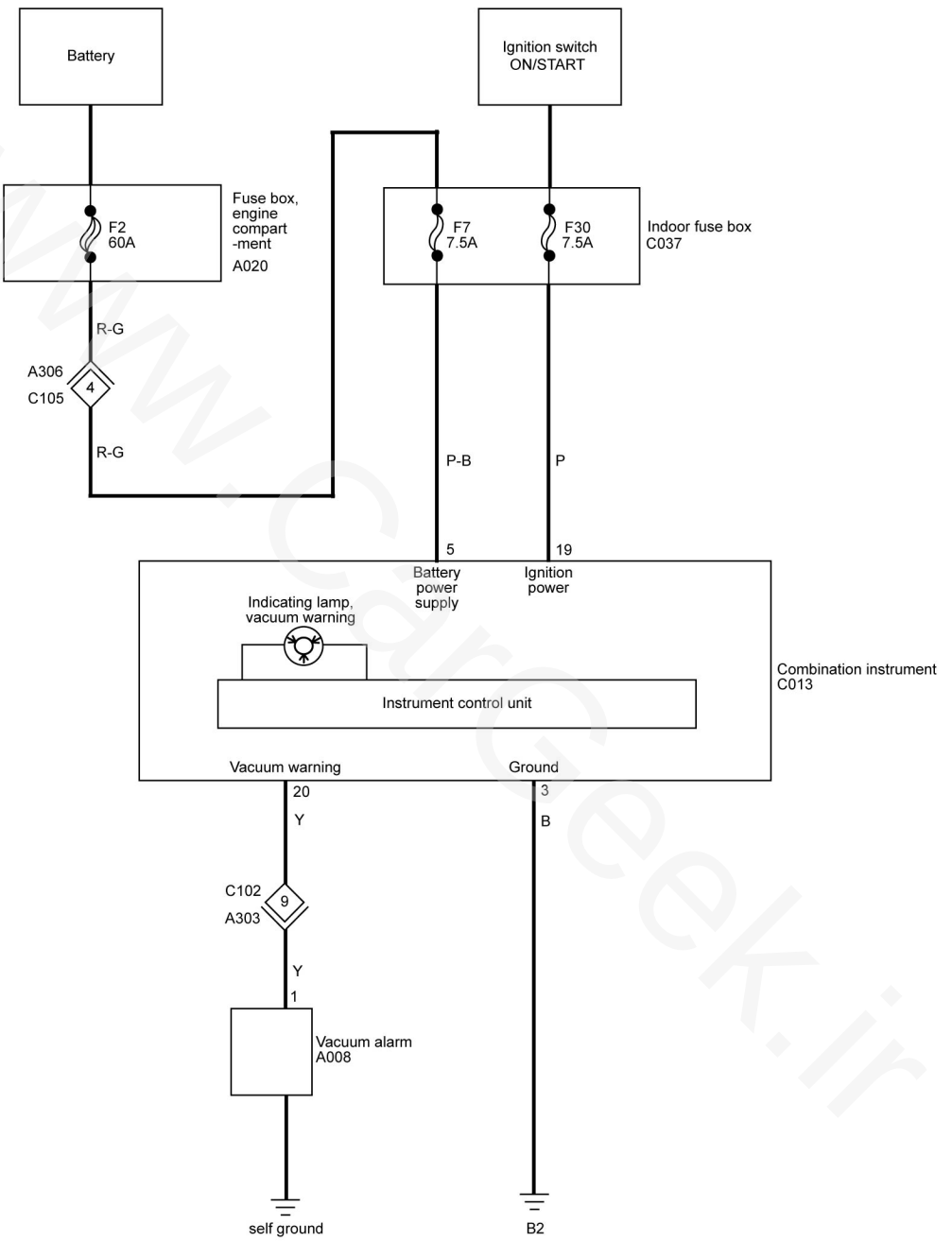
Check whether the result is normal?

Yes >Repair the opened circuit between pins 1 and 17 of connector C013 of combination instrument and the pins 38 and 39 of connector E001 of engine coolant temperature sensor.

No > Replace the engine control module.

VACUUM ALARM INDICATOR LAMP FAILS TO GO ON/NORMALLY ON

Circuit diagram

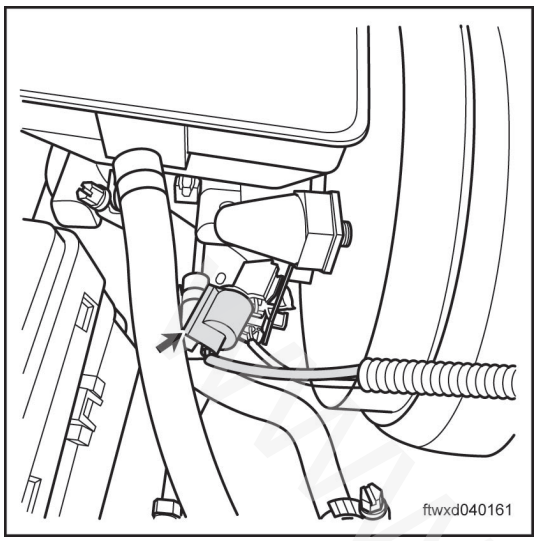


ftwxd040622

Diagnostic steps

1 . Check whether the signal circuit of vacuum alarm indicating lamp is short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector A008of the vacuum alarm.

(c) Ignition Switch: ON.

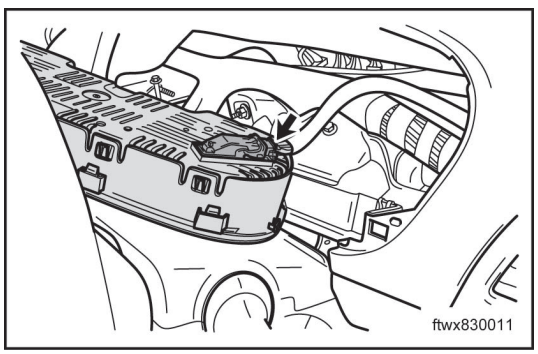
Check whether the vacuum alarm indicating lamp is off.

Yes > Change the vacuum alarm.

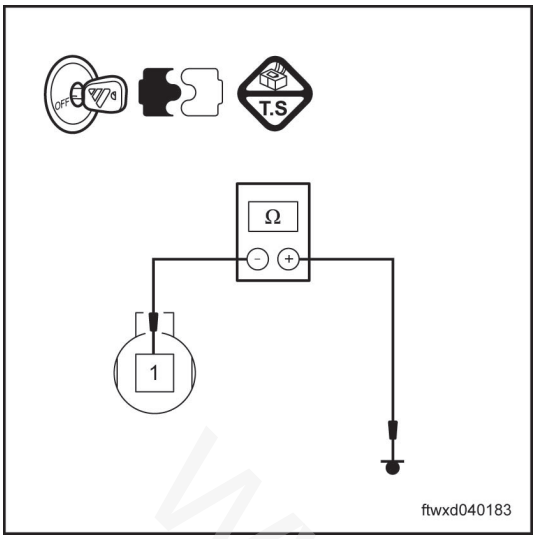
No> go to step 2

2 . Check whether the signal circuit of vacuum alarm indicating lamp is short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector C013 of combination instrument.



(c) Use a multimeter to measure the resistance between pin 1 of connector A008 of vacuum alarm and ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
A 008 (1) - Grounding	⩾ 1 MΩ

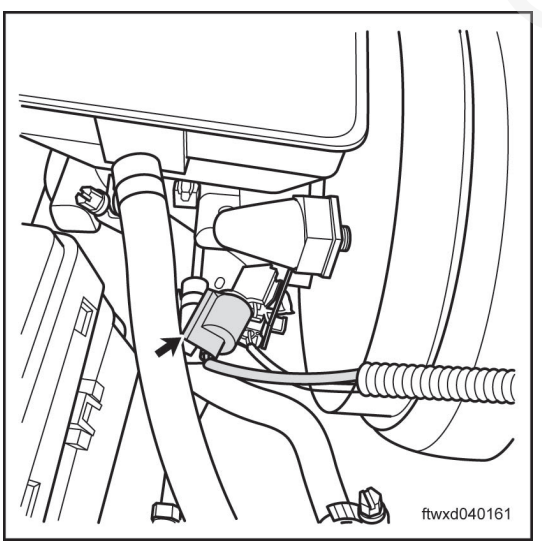
Check whether the result is normal?

Yes> replace combination instrument assembly.

No > Repair the to-ground short circuit of signal circuit between the pin 1 of connector C013 of the vacuum alarm and the pin 20 of connector C013 of the combination instrument.

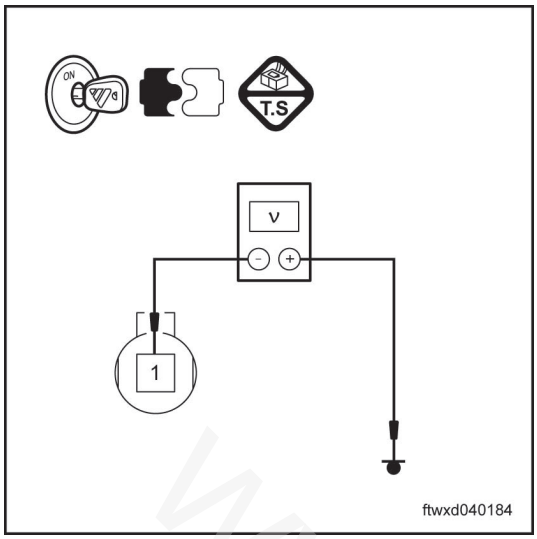
3 . Check whether the signal circuit of vacuum alarm indicating lamp is of open circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector A008 of the vacuum alarm.

(c) Ignition Switch: ON.



(d) Use the multimeter to measure the voltage betweenpin 1 of connector A008 of vacuum alarm and ground .

Standard voltage

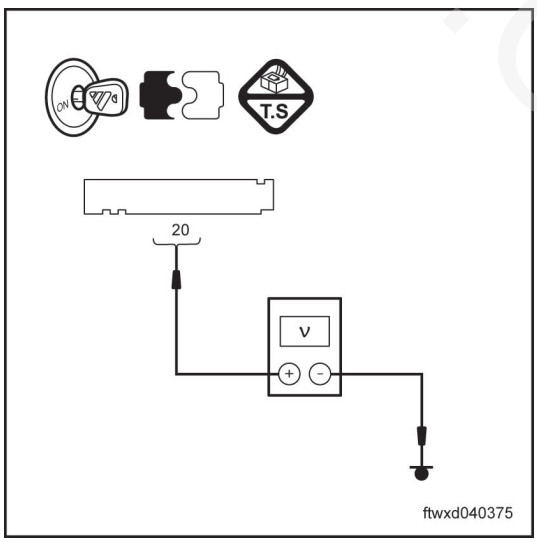
Multimeter connection	Standard value
A 008 (1) - Grounding	Battery voltage

Check whether the result is normal?

Yes > Change the vacuum alarm.

No> go to step 4

4 . Check whether the signal circuit of vacuum alarm indicating lamp is of open circuit



(a) Use a multimeter to measure the voltage between pin 20 of connector C013 of combination instrument and the ground.

Standard voltage

Multimeter connection	Standard value
C013 (20) -ground	Battery voltage

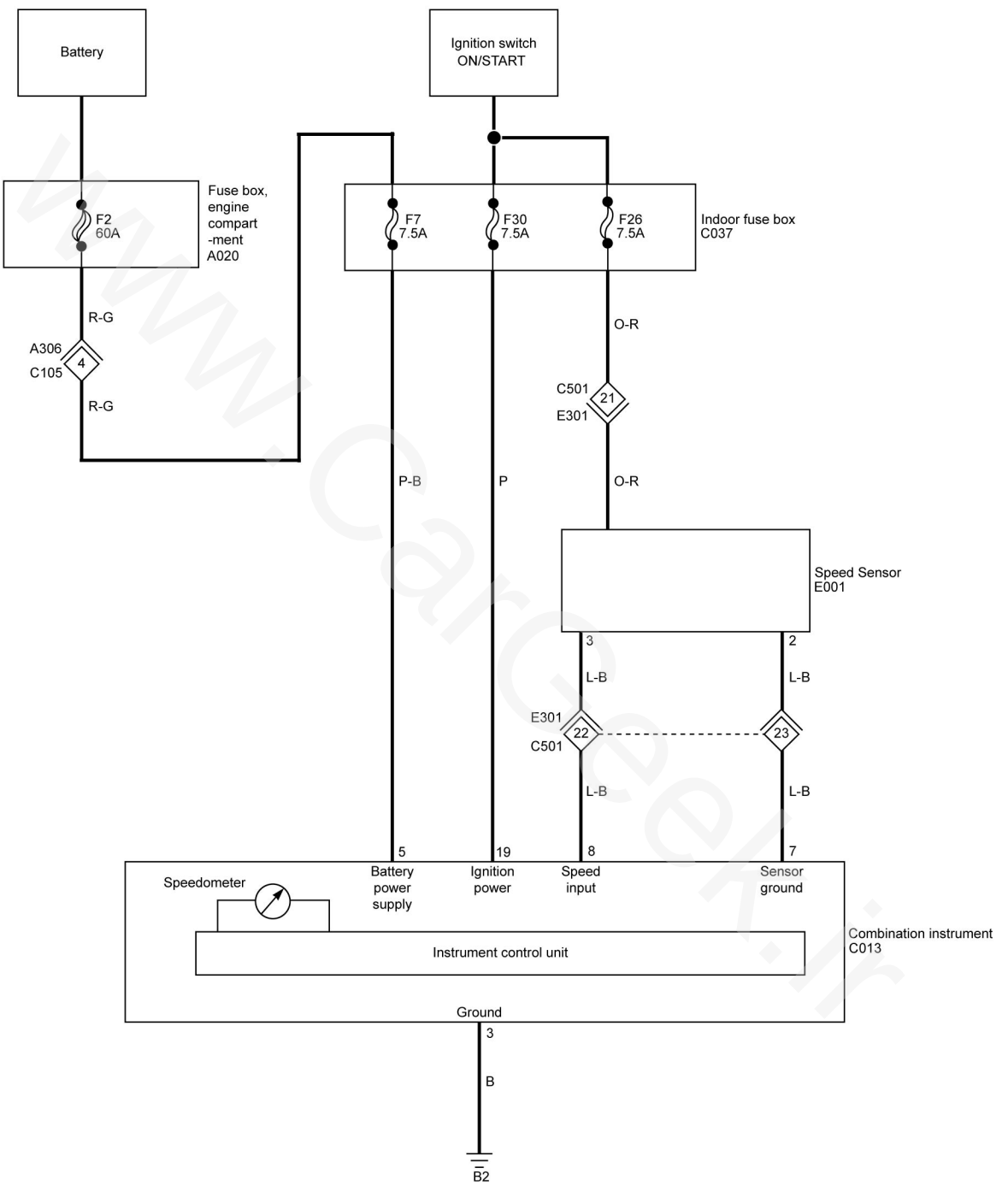
Check whether the result is normal?

If Yes> Repair the open circuit of signal circuit between the pin 1 of connector A008 of the vacuum alarm and the pin 20 of connector C013 of the combination instrument.

No> Replace the combination instrument assembly.

SPEEDOMETER DEFECTS

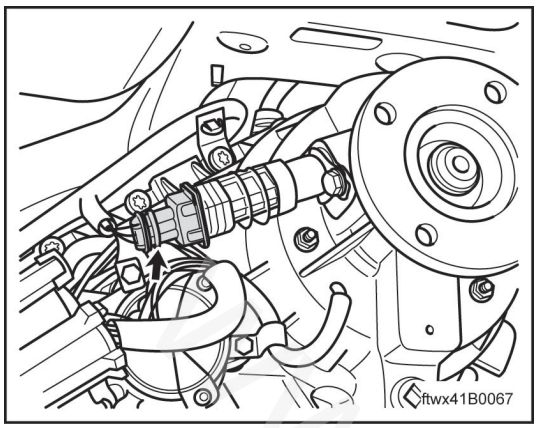
Circuit Diagram



Diagnostic step

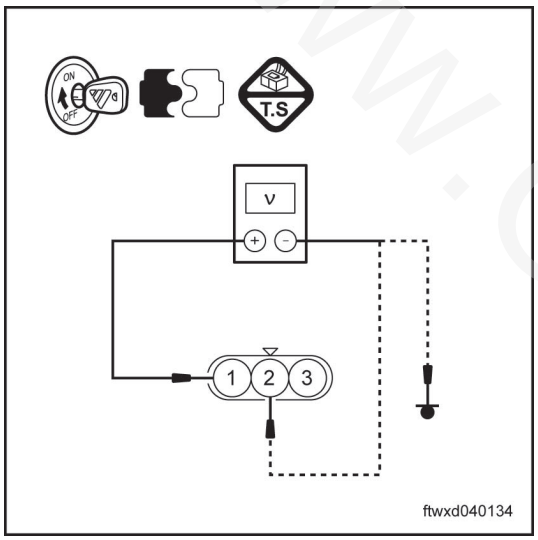
1 . Check operating voltage of the sensor , speedometer

(a) Ignition Switch: OFF.



(b) Disconnect speedometer E001 connector

(c) Ignition Switch: ON.



(d) Use multimeter to measure speedometer sensor E001 connector No.1 stitch and No.2 stitch respectively, and the voltage between No.1 stitch and ground connection.

Standard voltage

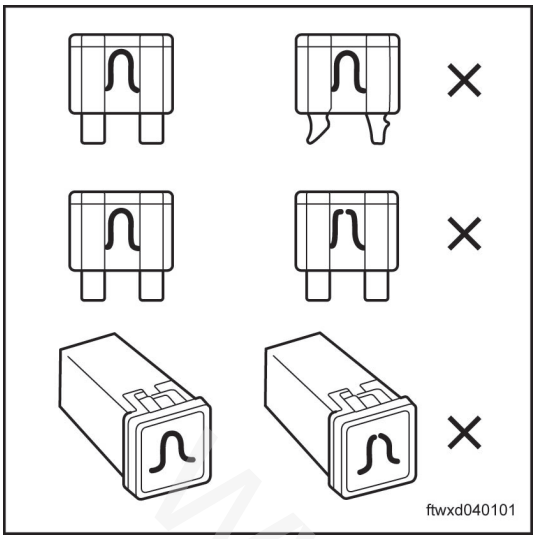
Multimeter connection	Standard value
E001 (1) - E001 (2)	Battery voltage
E001 (1) ground	

Check whether the result is normal?

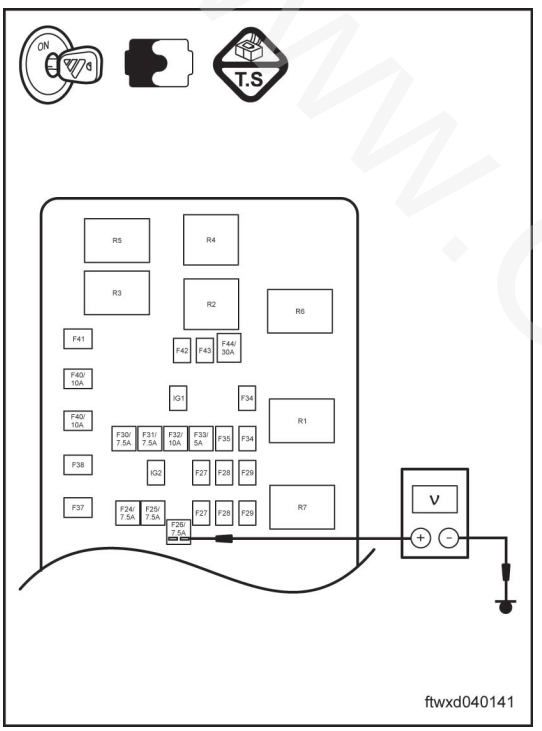
Yes> go to step 3

No> If both have no voltage, go to step2. If there is voltage between No.1 stitch and ground connection, repair the open circuit between No.2 stitch of the speed sensor E001 connector and No.7 stitch of assembly instrument C013 connector .

2 . Check supply circuit, speed sensor



(a) Check whether fuse F26 (7.5A) of the body is fusing or not.



(b) Use multimeter to measure the voltage between fuse F26 of the body and ground .

Standard voltage

Multimeter connection	Standard value
F26-ground	Battery voltage

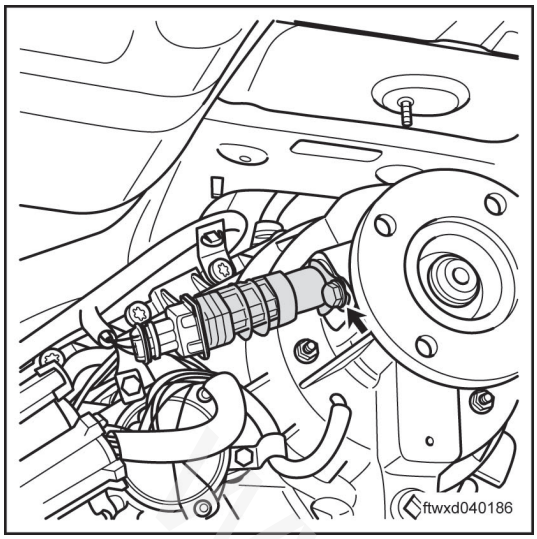
Check whether the result is normal?

Yes> go to step 3

No> Repair the circuit between fuse box of vehicle body: F26 (7.5A) and No.1 stitch of vehicle speed sensor E001 connector.

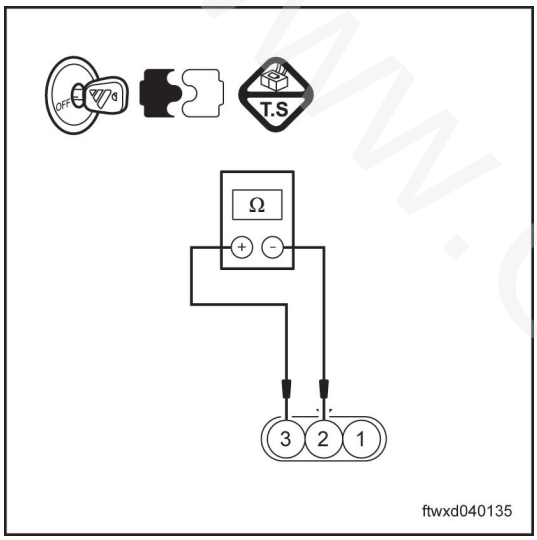
3 . Check speedometer sensor

(a) Ignition Switch: OFF.



(b) Dismantle vehicle speed sensor.

(c) Rotate the spindle of vehicle speed sensor.



(d) Use multimeter to measure the resistance between No.2 stitch speed sensor E001 connector and No.3 stitch.

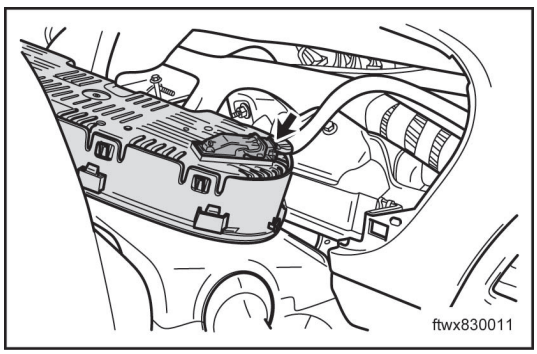
Pulse signal: each rotation should have 8 pulse resistance signal

Check whether the result is normal?

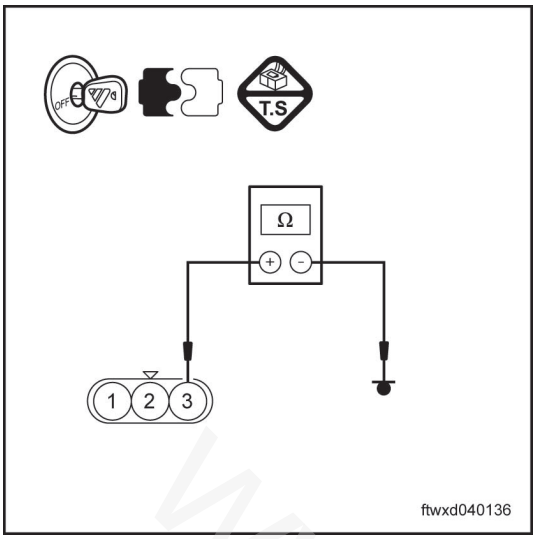
Yes> go to step 4

No> Replace speedometer sensor

4 . Check sensor signal circuit, speedometer



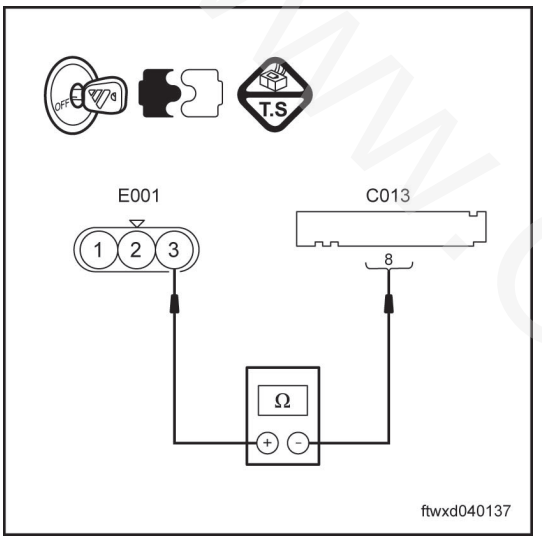
(a) Disconnect assembly instrument C013 connector



(b) Use multimeter to measure the resistance between No.3 stitch of speed sensor E001 connector and ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
E001 (3) ground	⩾ 1 MΩ



(c) Use multimeter to measure the resistance between No.3 stitch speed sensor E001 connector and No.8 stitch of C013 connector.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
E001 (3) - C013 (8)	⩽ 2 Ω

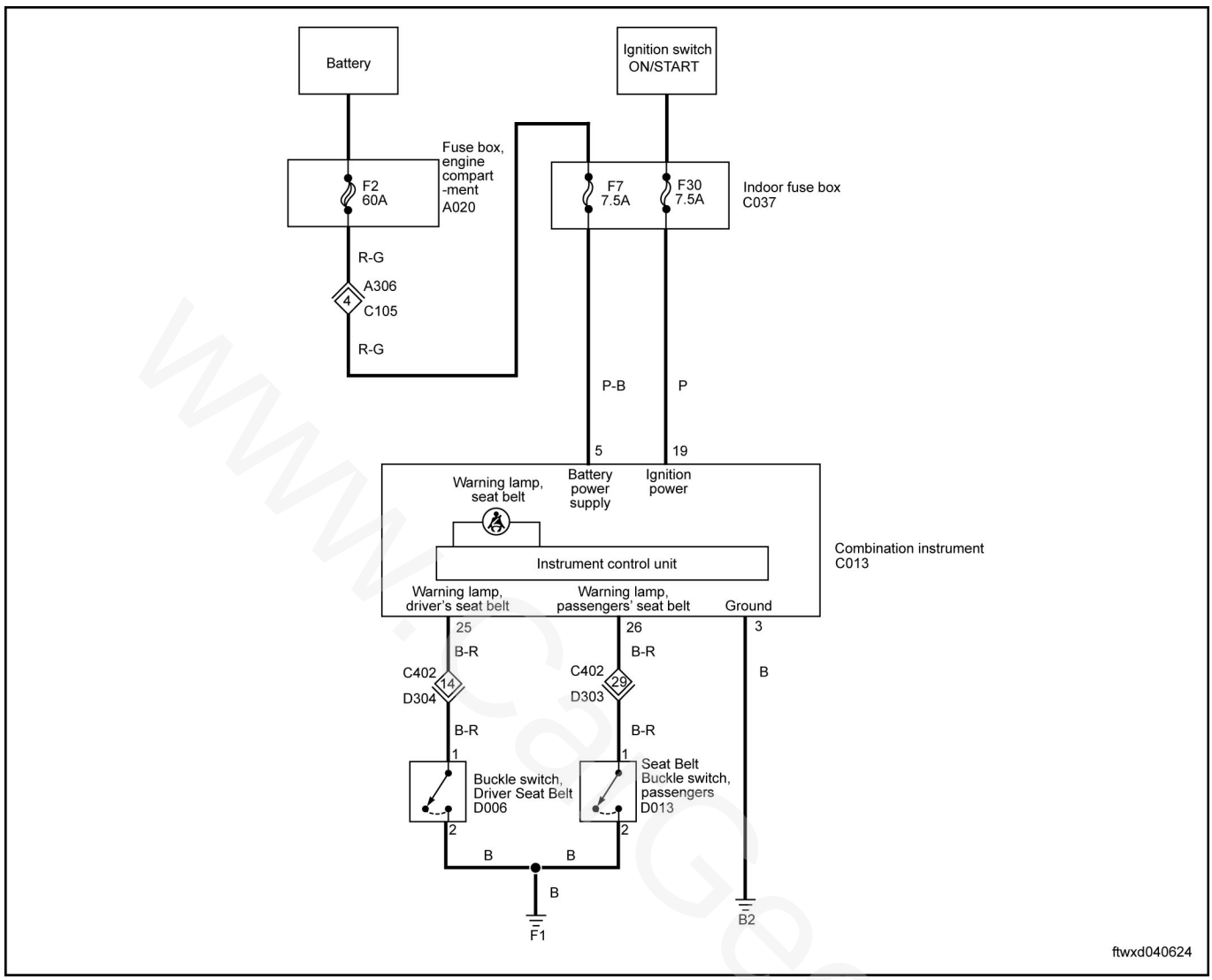
Check whether the result is normal?

Yes> replace combination instrument assembly.

No > Repair signal circuit between No.3 stitch of speed sensor E001 connector and No.8 stitch of combination instrument C013 connector

SEAT BELT INDICATING LAMP IS NOT ON/ALWAYS ON

Circuit Diagram



Diagnostic step

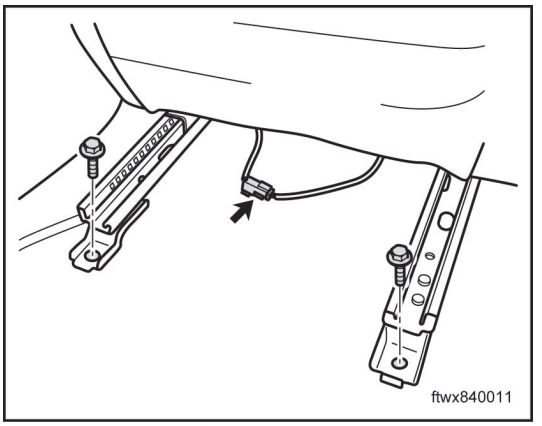
- **Ignition Switch: ON.**
- **Seat belt indicating lamp on the side of driver shall be on**
- **Insert the seat belt into the buckle and seat belt indicating lamp on the side of driver shall go out.**

Check the seat belt indicating lamp on the side of driver, if it is always on or off, then go to the step 1.

Check the seat belt indicating lamp on the side of passenger, if it is always on or off, then go to the step 5.

1 . Check whether the signal circuit of seat belt indicating lamp is of short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector of the seat belt alarm switch D006 on the side of driver.

(c) Ignition Switch: ON.

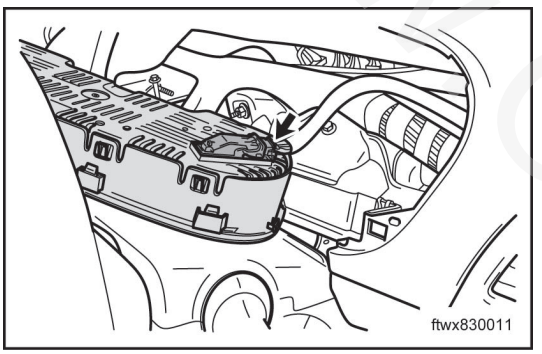
Check whether the seat belt indicating lamp on the side of driver is off

Yes> Replace the seat belt alarm switch on the side of driver.

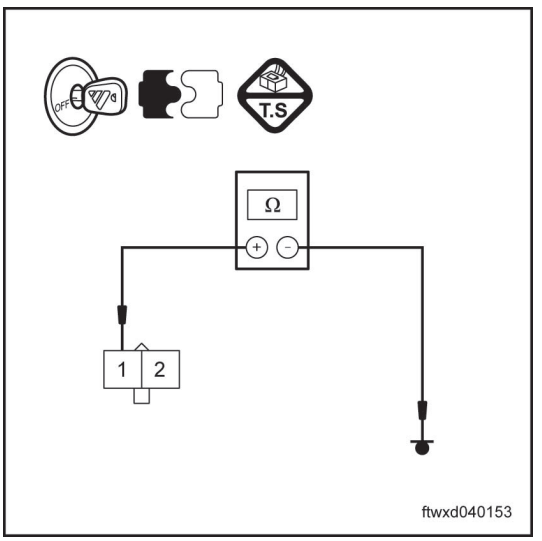
No> go to step 2

2 . Check whether the signal circuit of seat belt indicating lamp is of short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector C013 of combination instrument.



(c) Use a multimeter to measure the resistance between the pin 1 of the connector of the seat belt alarm switch D006 on the side of driver and ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
D006 (1) - Grounding	⩾ 1 MΩ

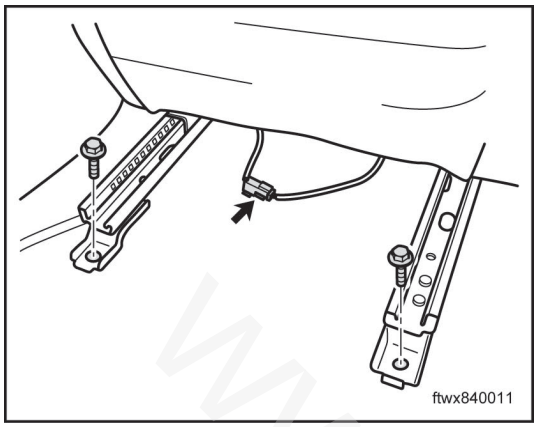
Check whether the result is normal?

Yes> replace combination instrument assembly.

No > Repair the ground short circuit of signal circuit between the pin 1 of the seat belt alarm switch D006 and the no.26 pin of connector of the combination instrument C013.

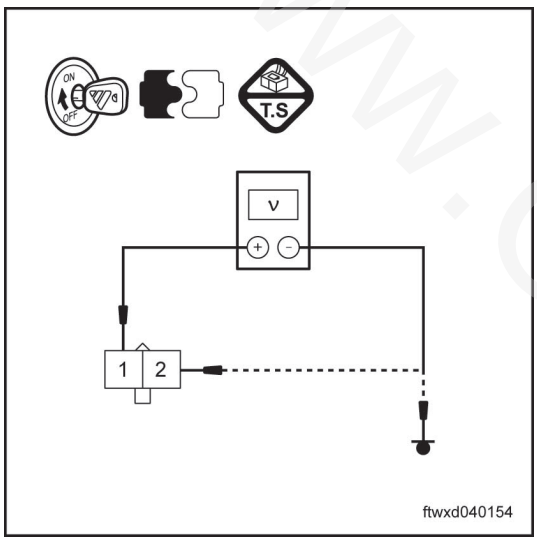
3 . Check whether the signal and ground circuit of seat belt indicating lamp on the side of driver are of short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector of the seat belt alarm switch D006 on the side of driver.

(c) Ignition Switch: ON.



(d) Use a multimeter to measure the voltage between the pin 1 of the connector of the seat belt alarm switch D013 on the side of passenger and ground; the pin 1 and pin 2.

Standard voltage

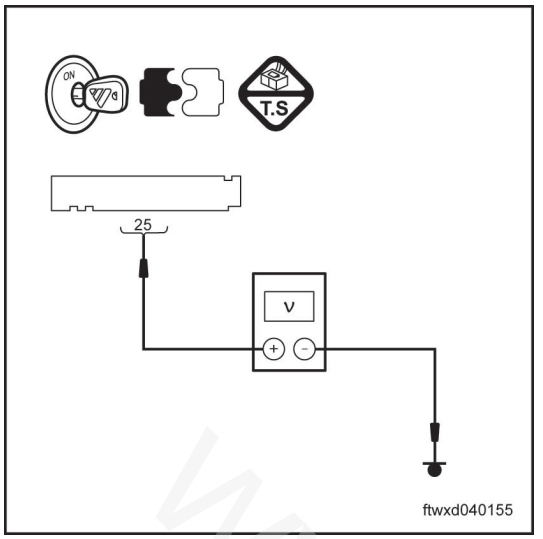
Multimeter connection	Standard value
D006 (1) - D006 (2)	Battery voltage
D006 (1) - Grounding	Battery voltage

Check whether the result is normal?

Yes> Replace the seat belt alarm switch on the side of driver.

No > If there is no voltage of a storage battery, go to step 4. If battery voltage is not available only between pin 1 and pin 2 of connector of seat belt alarm switch D006 on the side of driver, repair the open circuit between pin 2 of seat belt alarm switch D006 on the side of driver and the ground F1.

4 . Check whether the signal circuit of seat belt indicating lamp on the side of driver is of short circuit



(a) Use a multimeter to measure the voltage between pin 25 of connector of the combination instrument C013 and the ground.

Standard voltage

Multimeter connection	Standard value
C013 (25) -ground	Battery voltage

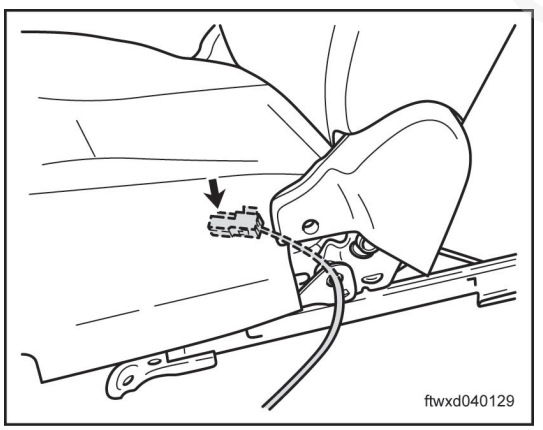
Check whether the result is normal?

Yes> Repair the open circuit of signal circuit between the pin 1 of the seat belt alarm switch D006 and the no.25 pin of connector of the combination instrument C013. 。

No> Replace the combination instrument assembly.

5 . Check whether the signal circuit of seat belt indicating lamp on the side of driver is of short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector of the seat belt alarm switch D013 on the side of driver.

(c) Ignition Switch: ON.

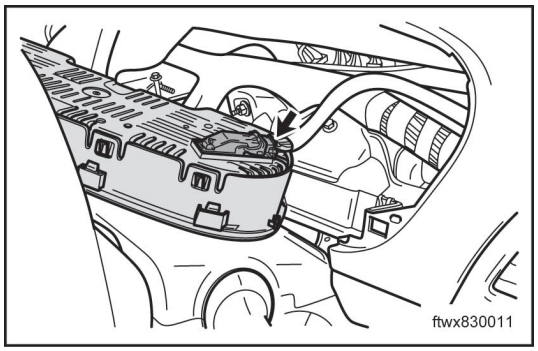
Check whether the seat belt indicating lamp on the side of passenger is off

Yes> Replace the seat belt alarm switch on the side of passenger.

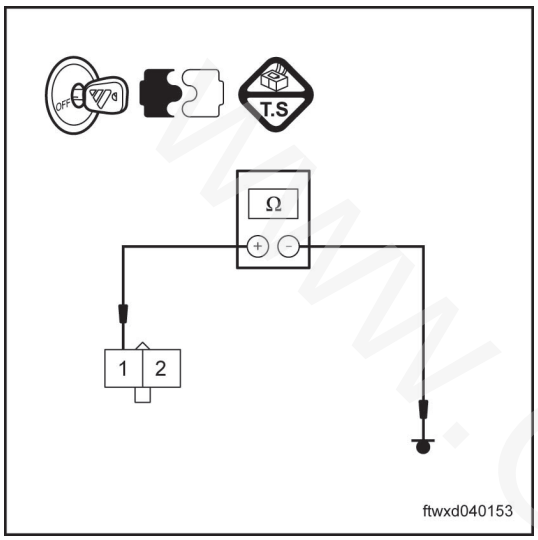
No> go to step 2

6 . Check whether the signal circuit of seat belt indicating lamp on the side of driver is of short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector C013 of combination instrument.



(c) Use a multimeter to measure the resistance between the pin 1 of the connector of the seat belt alarm switch D013 on the side of passenger and ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
D013 (1) - Grounding	⩾ 1 MΩ

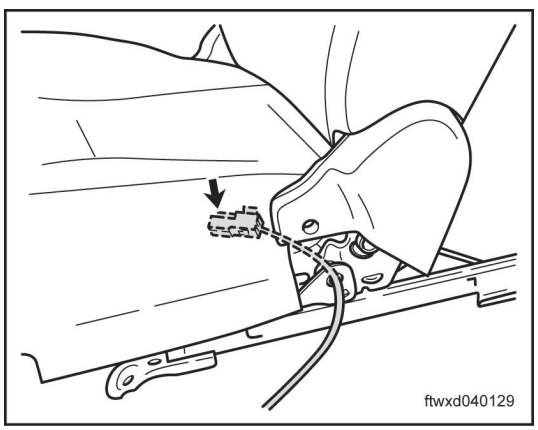
Check whether the result is normal?

Yes> replace combination instrument assembly.

No > Repair the ground short circuit of signal circuit between the pin 1 of the seat belt alarm switch D006 and the no.26 pin of connector of the combination instrument C013.

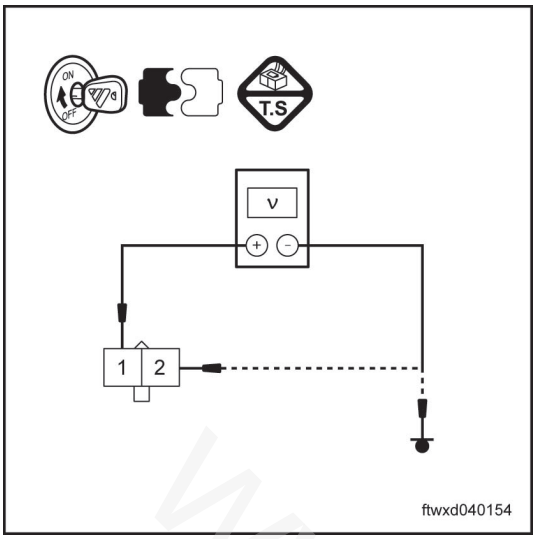
7 . Check whether the signal and ground circuit of seat belt indicating lamp on the side of passenger are of open circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector of the seat belt alarm switch D013 on the side of driver.

(c) Ignition Switch: ON.



(d) Use a multimeter to measure the voltage between the pin 1 of the connector of the seat belt alarm switch D013 on the side of passenger and ground; the pin 1 and pin 2。

Standard voltage

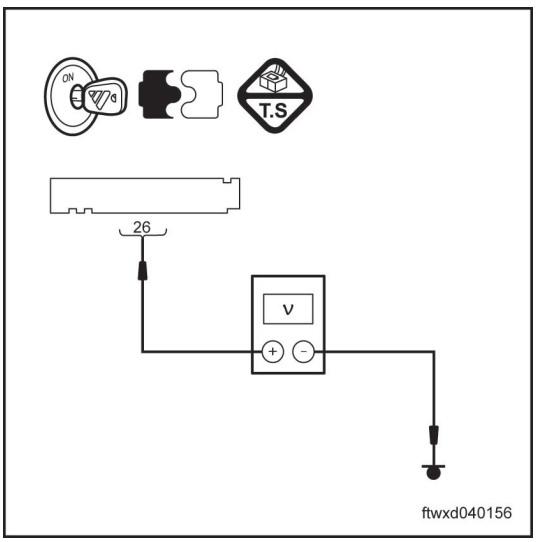
Multimeter connection	Standard value
D013 (1) - D013 (2)	Battery voltage
D013 (1) - Grounding	Battery voltage

Check whether the result is normal?

Yes> Replace the seat belt alarm switch on the side of passenger.

No > If there is no voltage of a storage battery, go to step 4. If battery voltage is not available only between pin 1 and pin 2 of connector of seat belt alarm switch D013 on the side of passenger, repair the open circuit between pin 2 of seat belt alarm switch D013 on the side of passenger and the ground F1.

8 . Check whether the signal circuit of seat belt indicating lamp on the side of passenger is of open circuit



(a) Use a multimeter to measure the voltage between pin 26 of connector of the combination instrument C013 and the ground.

Standard voltage

Multimeter connection	Standard value
C013 (26) -ground	Battery voltage

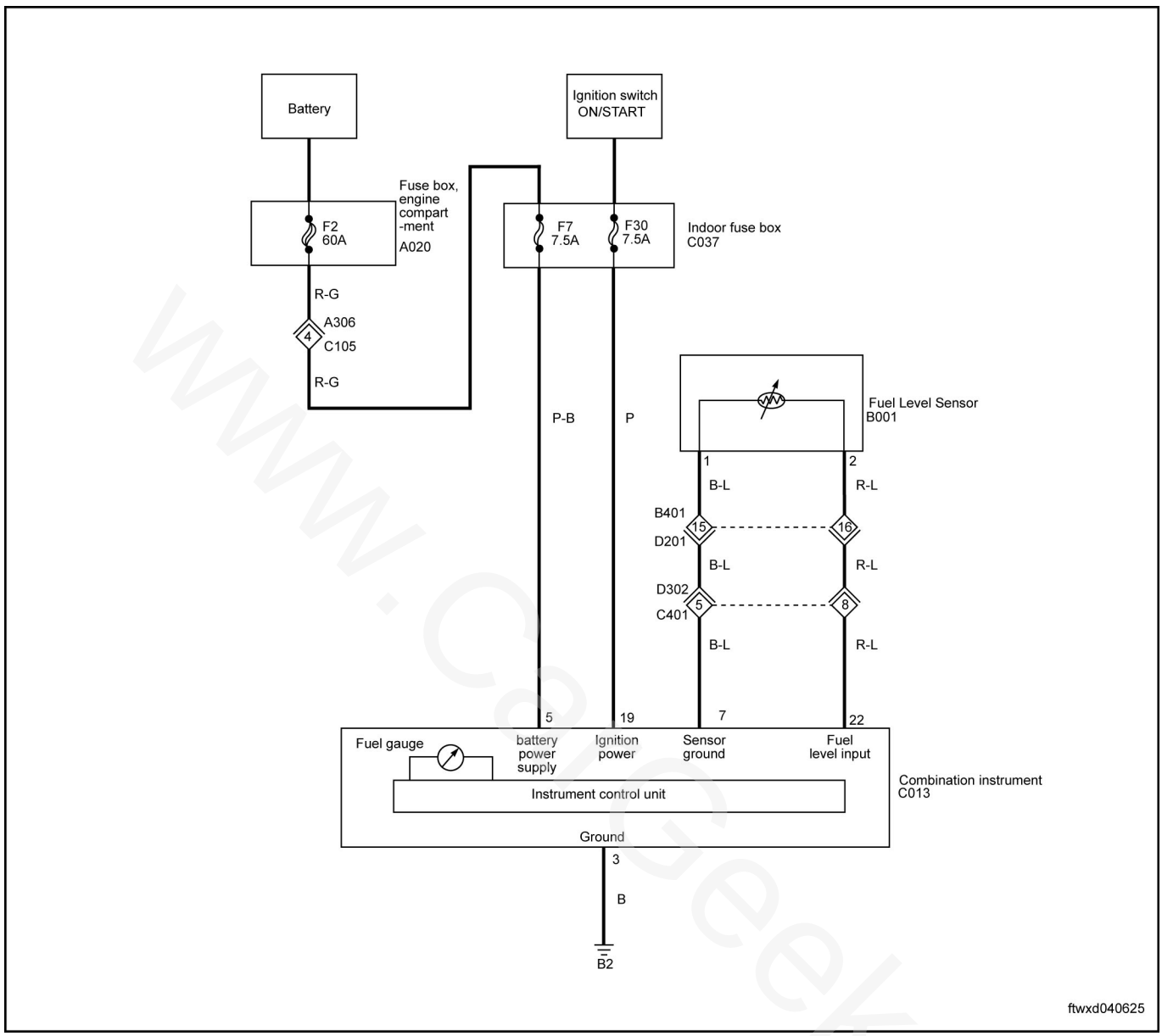
Check whether the result is normal?

Yes> Repair the open circuit of signal circuit between the pin 1 of the seat belt alarm switch D013 on the side of passenger and the no.26 pin of connector of the combination instrument C013.

No> Replace the combination instrument assembly.

FUEL GAGE FAULTS

Circuit Diagram

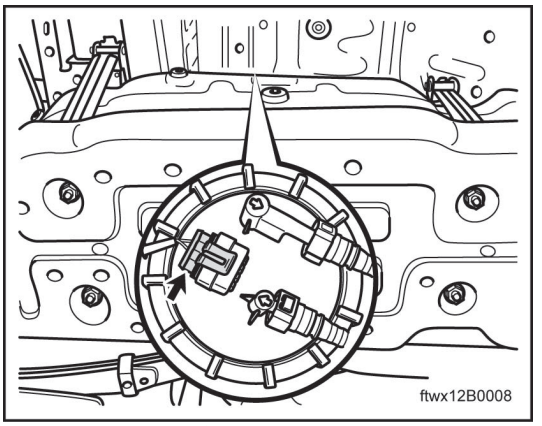


Diagnostic step

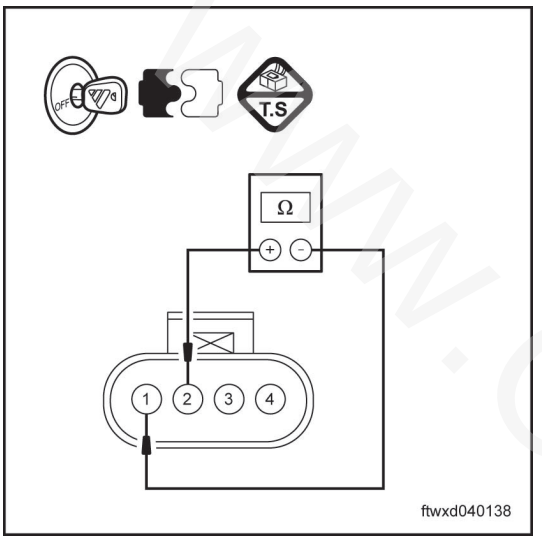
- **Ignition switch: ON, confirm whether there is enough fuel in the fuel tank (greater than 1/4 fuel liquid level).**
- **When the fuel level of the fuel tank is lower than 27± 2.5 mm or fuel sensor resistance value is greater than 189 ± 4 Ω, fuel alarm indicating lamp will be on.**
- **When the fuel level of the fuel tank is greater than 27± 2.5 mm or fuel sensor resistance value is lower than 189 ± 4 Ω, fuel alarm indicating lamp will be off.**

1 . Check the fuel sensor

(a) Ignition Switch: OFF.



(b) Disconnect the connector of the fuel sensor B001.



(c) Use a multimeter to measure the resistance between pin 1 and pin 2 of the connector of the fuel sensor B001.

(d) Dismantle the fuel sensor, imitate the states of different positions under the fuel liquid surface according to the form below.

Floater position	Empty:	Alarm position	1/4	1/2	3/4	Full
Resistance (Ω)	283 ± 6	189 ± 4	137 ± 4	89 ± 3	62 ± 2.5	38 ± 1.5

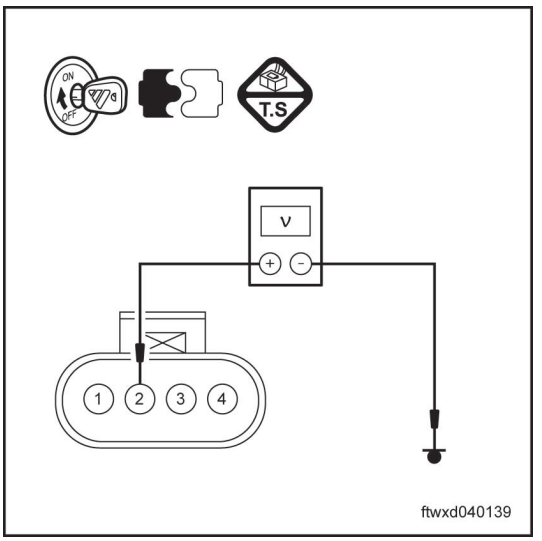
Check whether the result is normal?

Yes> go to step 2

If no > Replace the fuel sensor..

2 . Check whether the signal circuits of the fuel sensor is of open circuit

(a) Ignition Switch: ON.



(b) Use a multimeter to measure the voltage between pin 2 of the connector of the fuel sensor B001 and ground.

Standard voltage

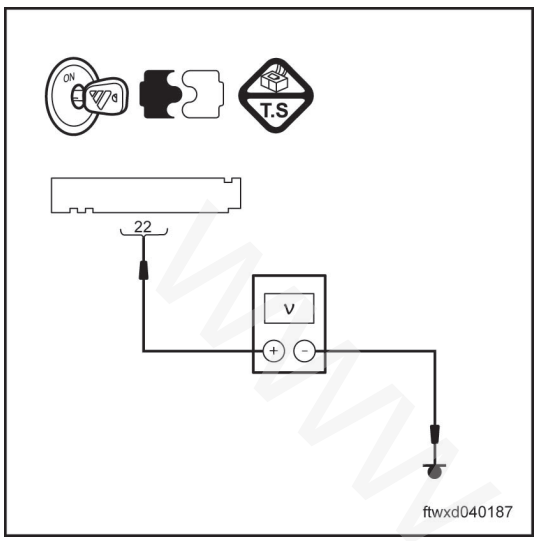
Multimeter connection	Standard value
B001 (2) - grounding	5 V

Check whether the result is normal?

Yes> go to step 4

If no > Go to step 3.

3 . Check whether the signal circuits of the fuel sensor is of open circuit



(a) Use a multimeter to measure the voltage between pin 22 of connector of the combination instrument C013 and the ground.

Standard voltage

Multimeter connection	Standard value
C013 (22) -ground	5 V

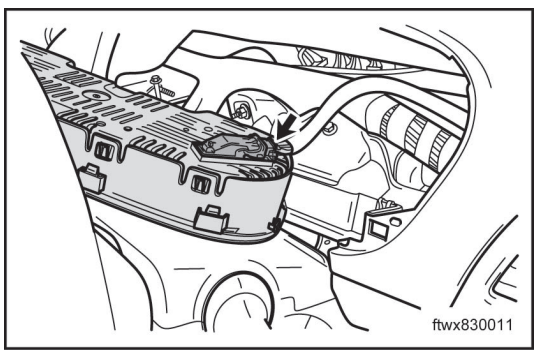
Check whether the result is normal?

If yes >Repair the circuit open circuit between pin 22 of connector of the combination instrument C013and the pin 2 of connector of the fuel sensor B001.

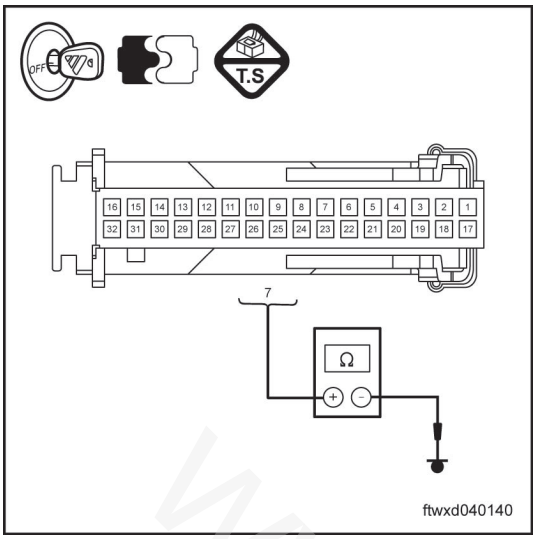
No> go to step 5

4 . Check whether the signal circuits of the fuel sensor is of short circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector of the combination instrument C045.



(c) Use a multimeter to measure the resistance between pin 7 of connector of the combination instrument C013 and the ground.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C013 (7) -ground	⩽ 2 Ω

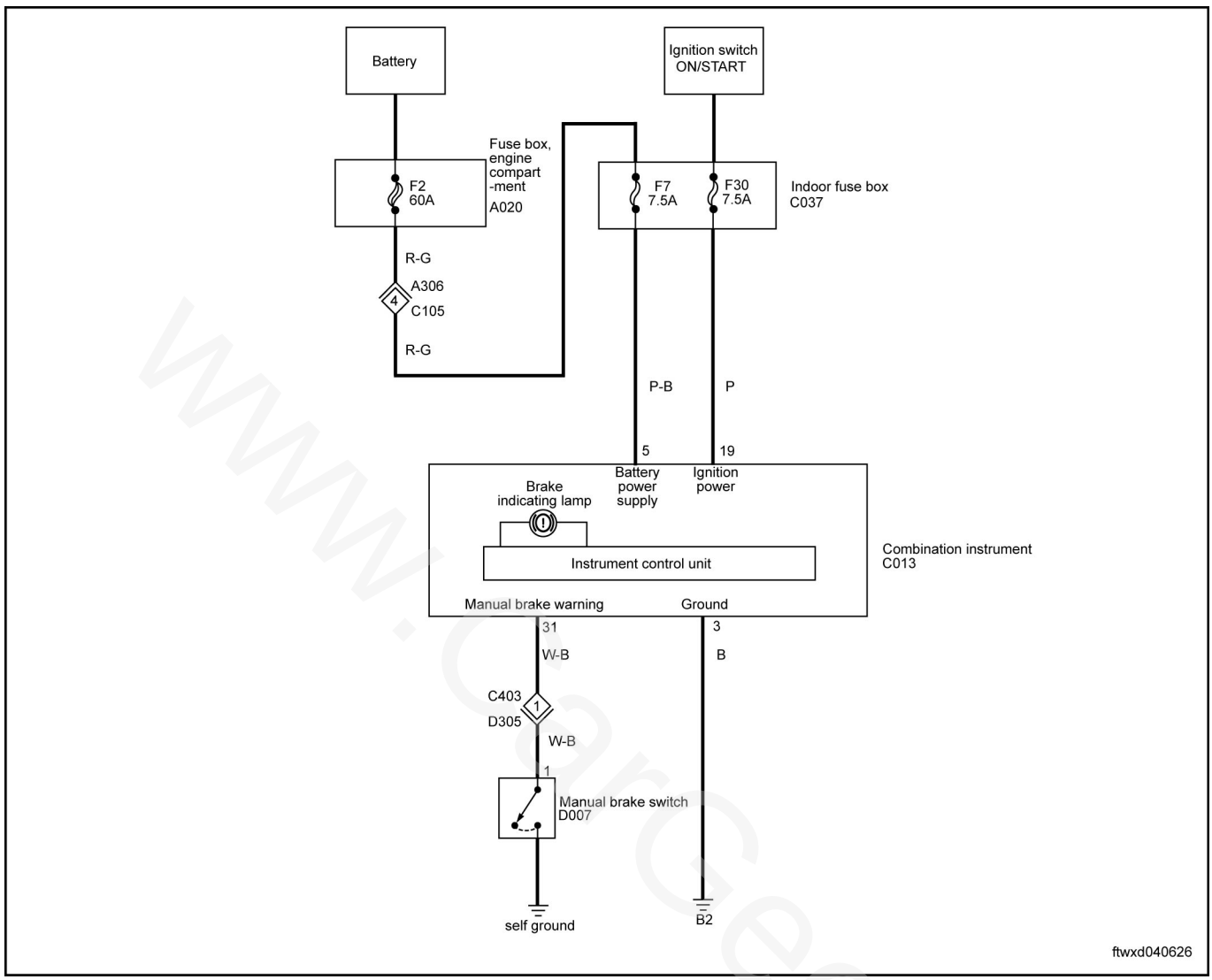
Check whether the result is normal?

Yes> replace combination instrument assembly.

If no> Repair the open circuit of ground circuit between the pin 1 of the fuel sensor B001and the pin 7 of the connector of the combination instrument C013.

BRAKE FAULT ALARM LAMP FAILS TO GO ON/NORMALLY ON

Circuit Diagram



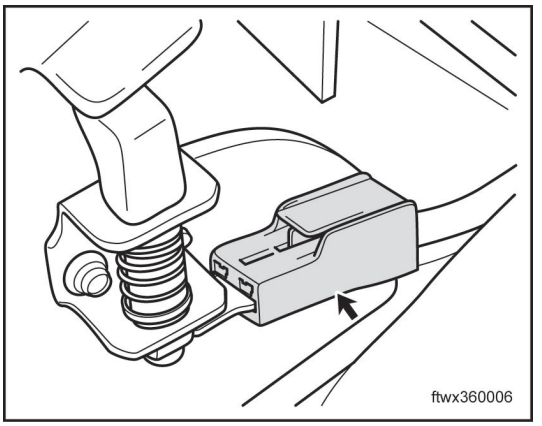
Diagnostic step

- **Check whether the brake (or clutch) liquid is too low, and specialized brake (or clutch) liquid shall be added if it is too low.**
- **Fix the four wheels with wedges.**
- **Ignition Switch: ON.**
- **Release and pull onboard brake separately.**

Check whether the brake alarm lamp is not on /always on

1 . Check the manual braking switch circuit.

(a) Ignition Switch: OFF.
(b) Release onboard brake



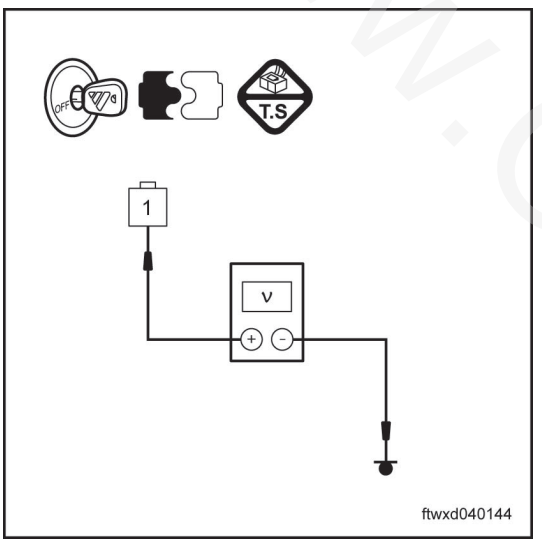
(c) Disconnect the braking switch connector D007.
(d) Ignition Switch: ON.

Check whether the brake failure alarm lamp is off

Yes > Replace the manual braking switch.

No> go to step 2

2 . Check whether the brake failure alarm lamp signal circuit



(a) Use a multimeter to measure the voltage between the pin 1 of manual braking switch and ground.

Standard voltage

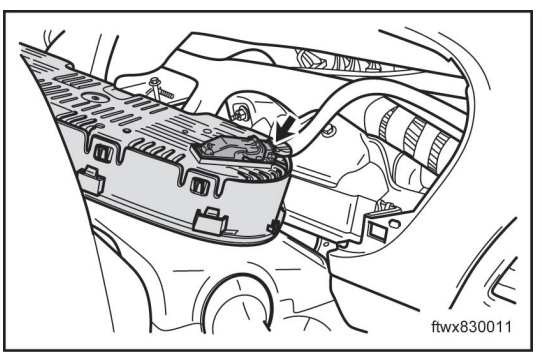
Multimeter connection	Standard value
D 007 (1) - Grounding	Battery voltage

Check whether the result is normal?

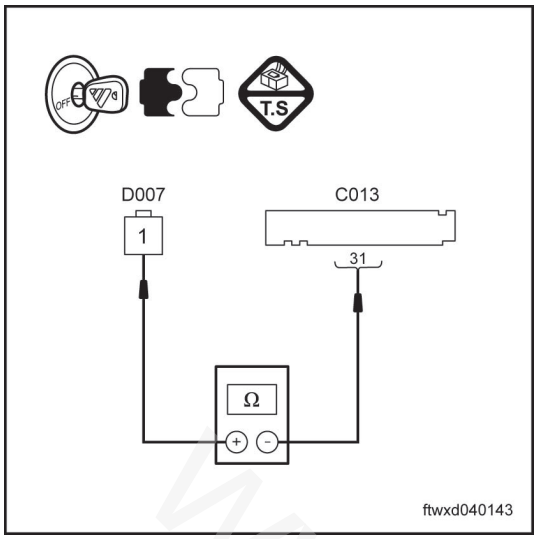
Yes > Replace the manual braking switch.

No> go to step 3

3 . Check the manual braking switch circuit.



(a) Disconnect the connector C013 of combination instrument.



(b) Use a multimeter to measure the resistance between pin 31of connector of the combined instrument C013 and the pin 1 of connector D007 of manual braking switch.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C013 (31) - D007 (1)	⩽ 2 Ω

04

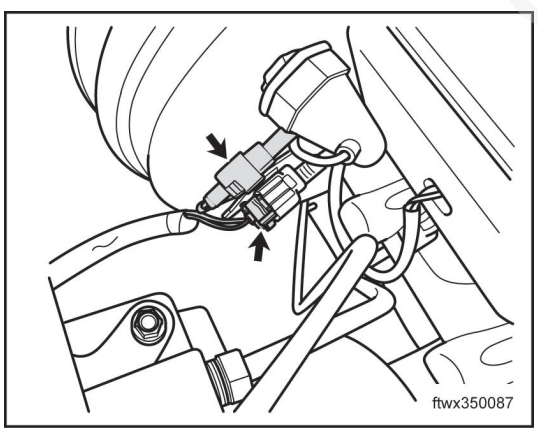
Check whether the result is normal?

Yes> replace combination instrument assembly.

No >Repair the circuit open circuit between pin 31of connector of combination instrument C013and the pin 1 of connector of manual braking switch D007.

4 . Check the brake liquid level alarm switch circuit

(a) Ignition Switch: OFF.



(b) Disconnect the connector of brake liquid level alarm switch A009.

(c) Ignition Switch: ON.

Check whether the brake failure alarm lamp is off

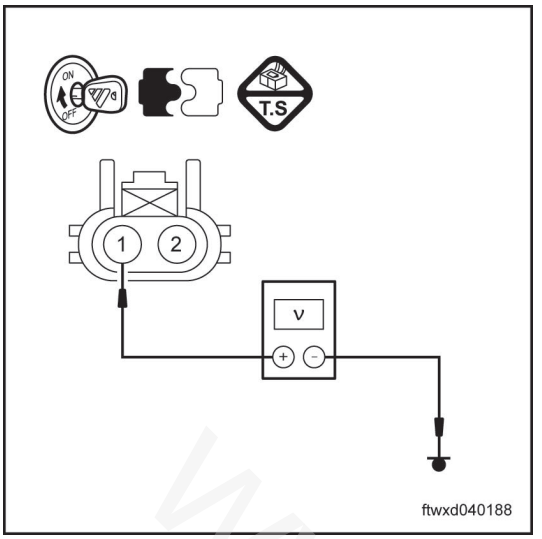
No > Replace the brake liquid level alarm switch.

No> go to step 5

⚠ **CAUTION**

Brake liquid level alarm switch should not be replaced separately, instead, the oil storage cup assembly is required to be replaced.

5 . Check the brake liquid level alarm switch signal circuit



(a) Use a multimeter to measure the voltage between the pin 1 of the brake liquid level alarm switch and ground.

Standard voltage

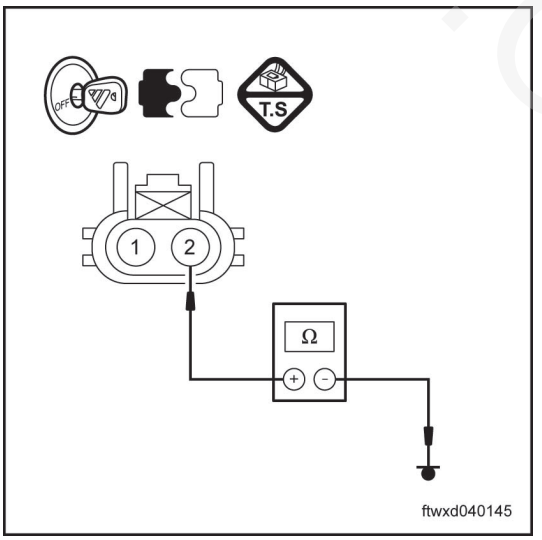
Multimeter connection	Standard value
A009 (1) - grounding	Battery voltage

Check whether the result is normal?

Yes> go to step 6

No> go to step 7

6 . Check whether the brake liquid level alarm switch circuit is of short circuit



(a) Use a multimeter to measure the resistance between thepin 2 of the brake liquid level alarm switch A009 and ground.

Standard resistance (check whether there is short circuit)

Multimeter connection	Standard value
A009 (2) - grounding	⩽ 2 Ω

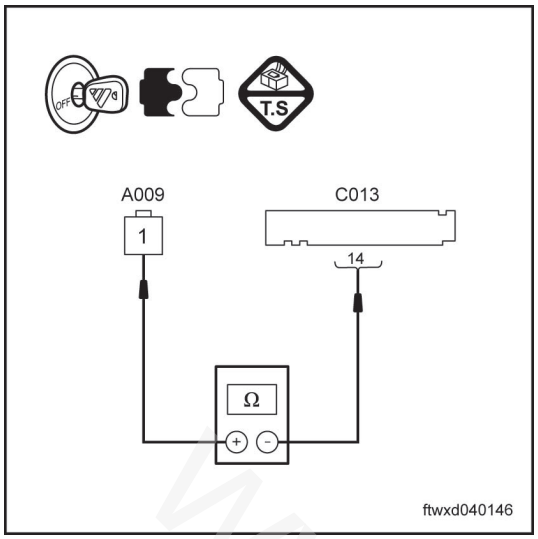
Check whether the result is normal?

No > Replace the brake liquid level alarm switch.

No> go to step 7

7 . Check the brake liquid level alarm switch circuit

(a) Disconnect the connector C013 of combination instrument.



(b) Use a multimeter to measure the resistance between no. 14 pin of connector of the combination instrument C013and the pin 1 of connector of the brake liquid level alarm switch A009.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C013 (14) - A009 (1)	⩽ 2 Ω

04

Check whether the result is normal?

Yes> replace combination instrument assembly.

No >Repair the circuit open circuit between pin 31of connector of connector of combination instrument C013and the pin 1 of connector of brake liquid alarm switch D007.

COMBINED DISPLAY

PRECAUTION

1 . Ignition switch representation

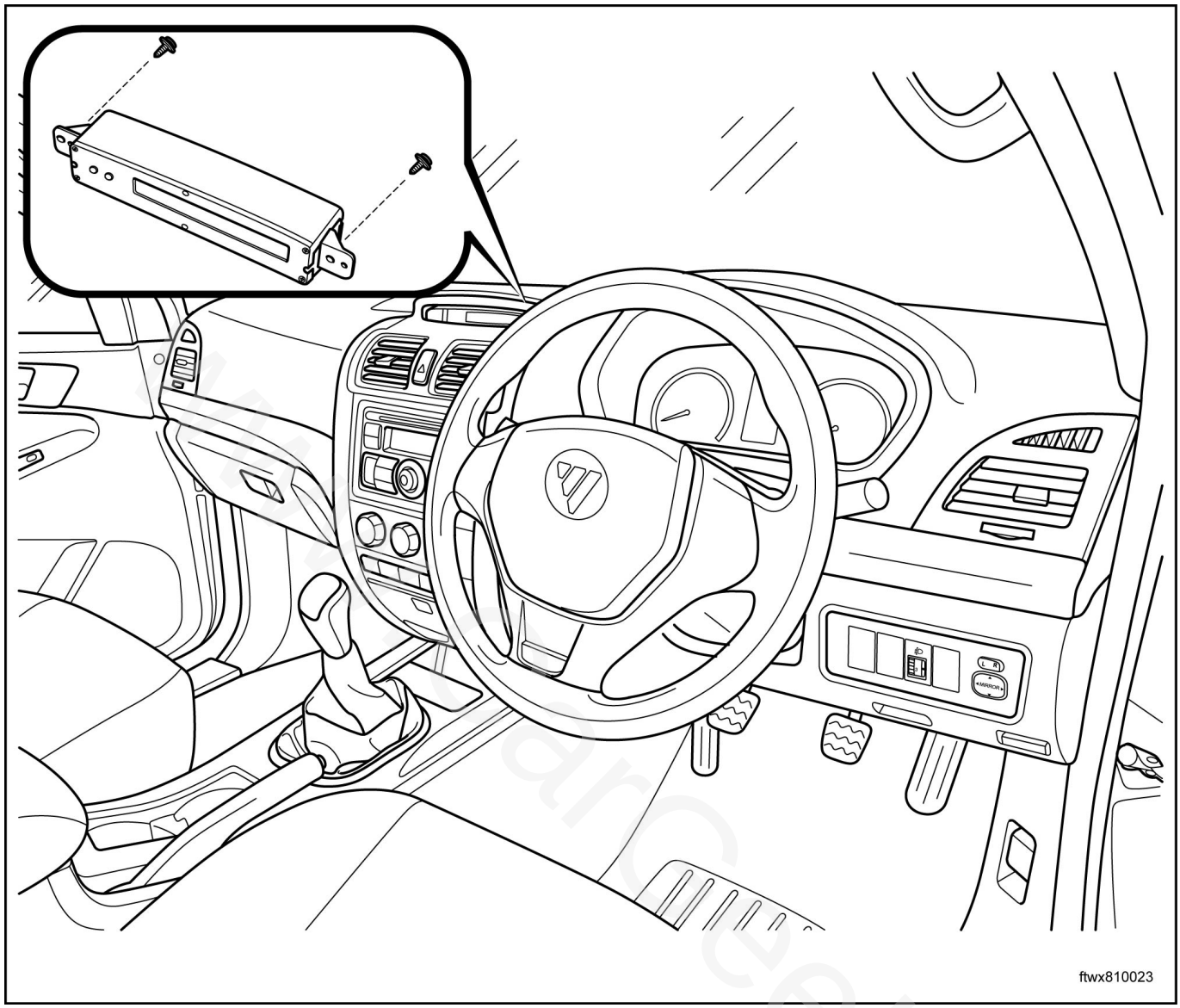
Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

2 . Disconnect power supply

(a) Before dismounting or installing any electric apparatus, or when tool or equipment is susceptible to touch exposed electric pins, be sure to disconnect the negative-pole cable of battery firstly to prevent persons or vehicle from being damaged.

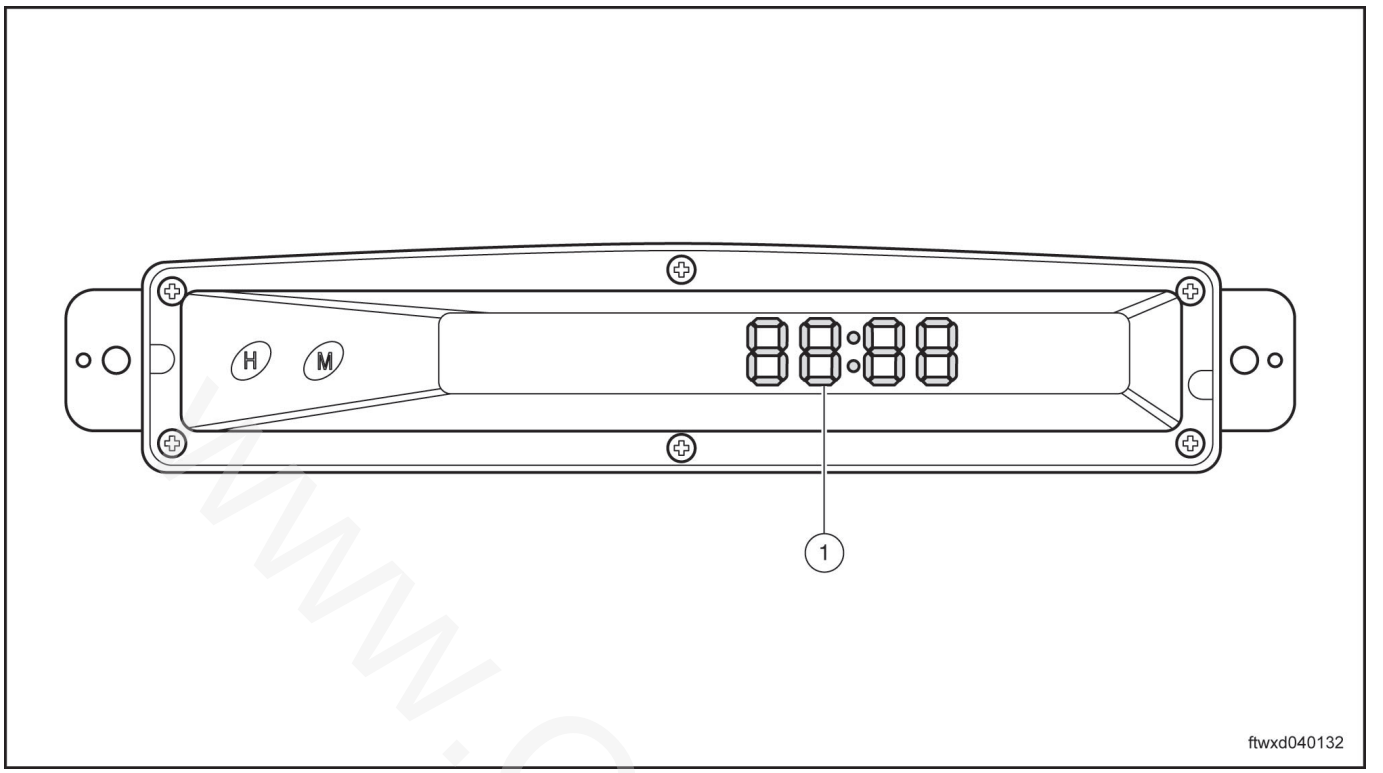
(b) If there is special illustration, ignition switch must be closed.

COMPONENTS DRAWING



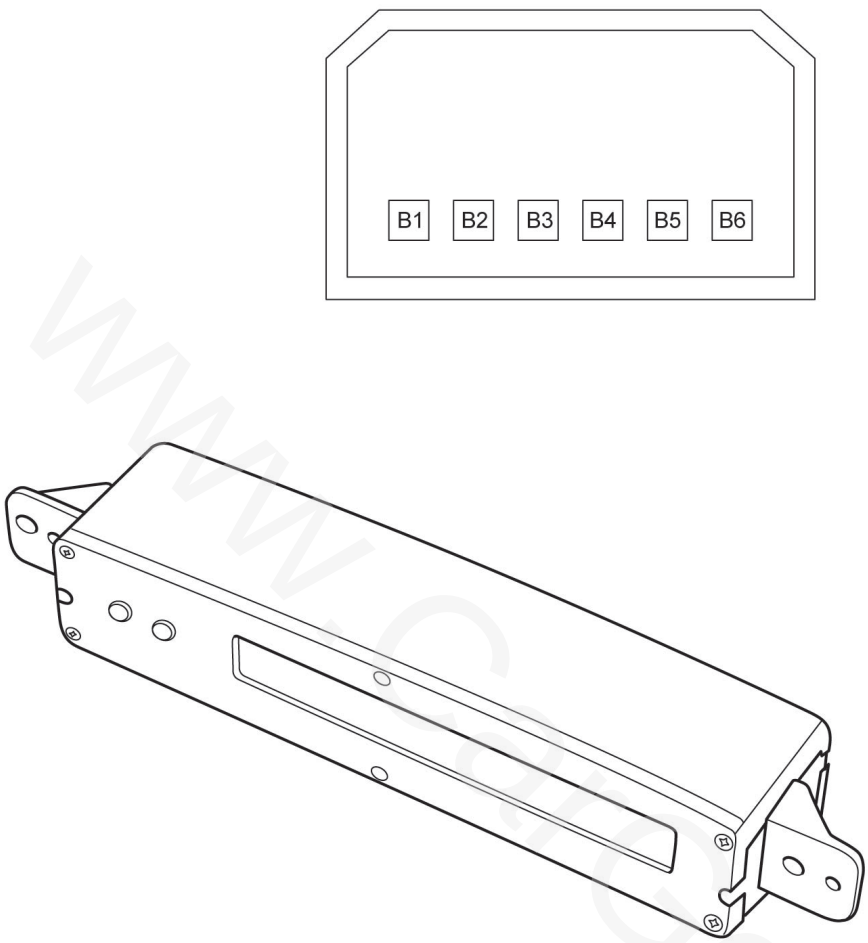
1	Combined Display

COMBINED DISPLAY DESCRIPTION



1	Time display

PIN DESCRIPTION FOR THE COMBINED DISPLAY



Stitch number	Connection rod color	Description
B1	White - red	Battery power supply
B2	-	-
B3	Purple - pink	LIN
B4	Blue	Backlight lighting
B5	Black	ground
B6	-	-

BASIC INSPECTION

Steps	Inspection contents		Measures
1	**Check Battery voltage** • Battery voltage shall not be lower than 12V. **Check whether the result is normal?**	Yes	Go to step 2
		No?	Charge or replace the battery.
2	**Check the function of combined display** • Ignition switch: ACC. The background light, time display, compass display are on. **Check whether the result is normal?**	Yes	Go to defect phenomenon form
		No?	Replace the combined display

DEFECT PHENOMENON FORM

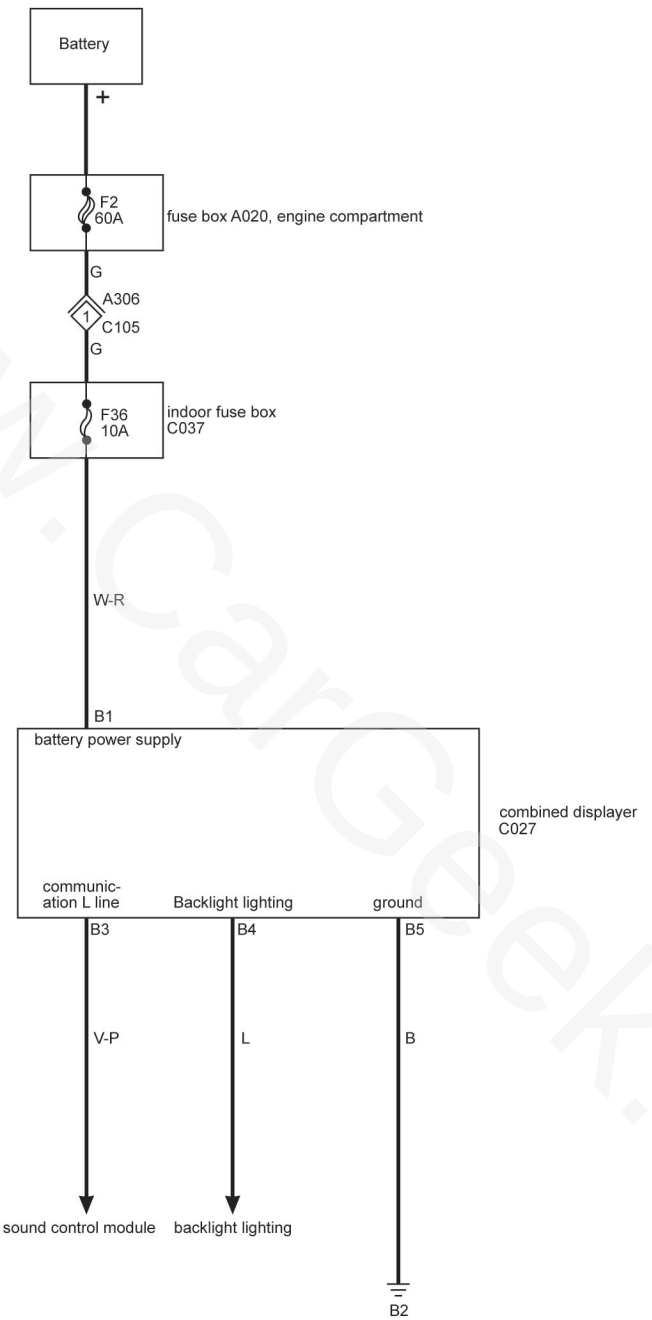
Check the table below to find the cause of the problem. The numbers rank the possibility of the causes. Check each part in this order and replace the part if necessary.

Defect phenomenon	Suspect Area	Reference
The combined display doesn’ t work at all	1. Fuse	-
	2. Combined Display	Chapter 81. Information system - combined display, replacement
	3. Circuit	-

THE COMBINED DISPLAY DOESN’T WORK AT ALL

Circuit Diagram

combined display system

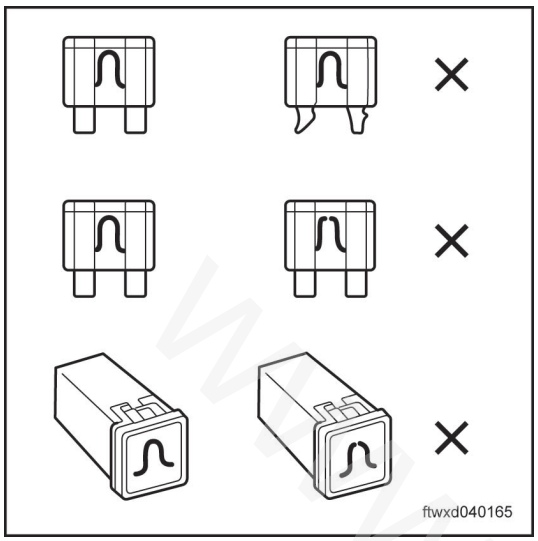


ftwxd040551

Diagnostic step

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F36 (10 A) in the vehicle body fuse box (C037).

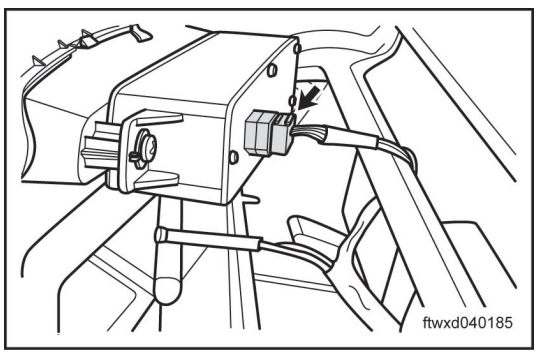
Check whether the result is normal?

Yes> go to step 3

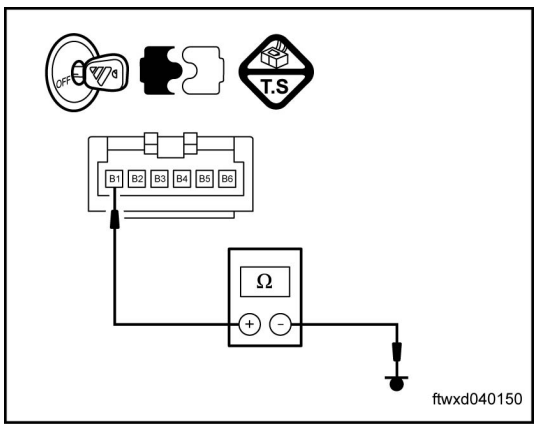
No> go to step 2

2 . Check the harness and connector (combined display -grounding)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C027 of the combined display.



(c) Measure the electrical resistance based on the value in the following form.

Standard resistance (Check for any short circuit)

Multimeter connection	Standard value
C027 (B1) - grounding	⩾1 MΩ

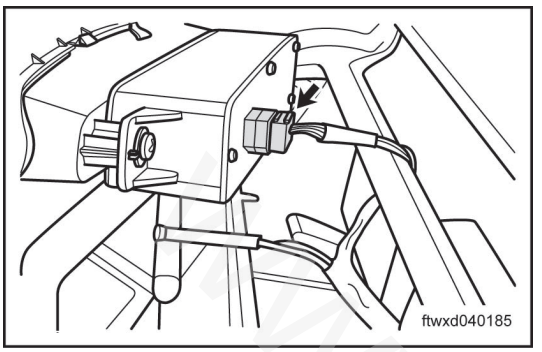
Check whether the result is normal?

Yes> Replace fuse

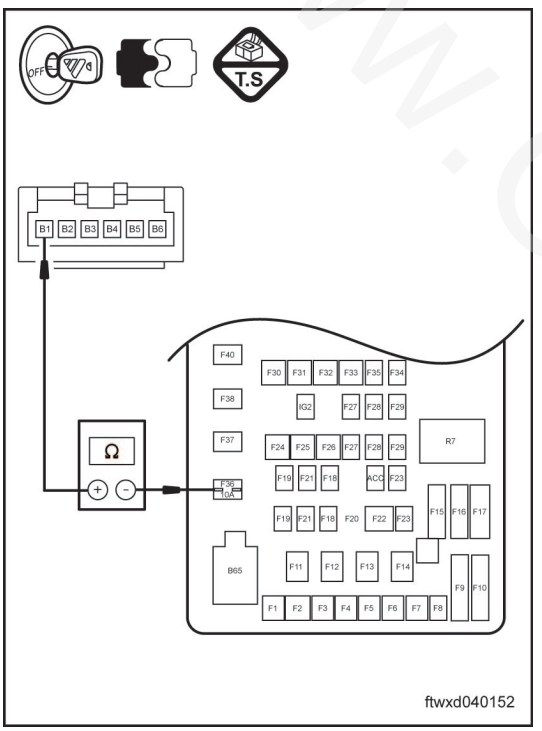
No > Maintenance or replace harness.

3 . Check the harness and connectors (combined display fuse - combined display)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C027 of the combined display.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
F36 (10 A） - C027（B1）	＜ 2 Ω

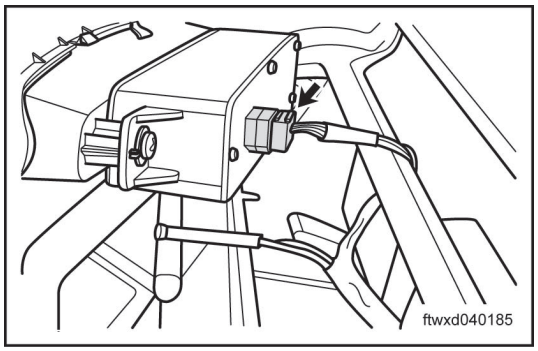
Check whether the result is normal?

Yes> go to step 4

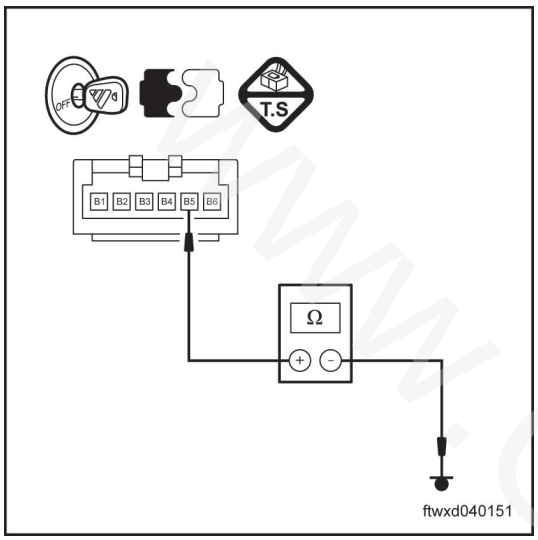
No > Maintenance or replace harness.

4 . Check the harness and connector (combined display -grounding)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C027 of the combined display.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C027 (B5) - grounding	< 2 Ω

Check whether the result is normal?

Yes >Replace the combined display.

No > Maintenance or replace harness.

VEHICLE CONTROL SYSTEM

PRECAUTION

1 . Disconnect power supply

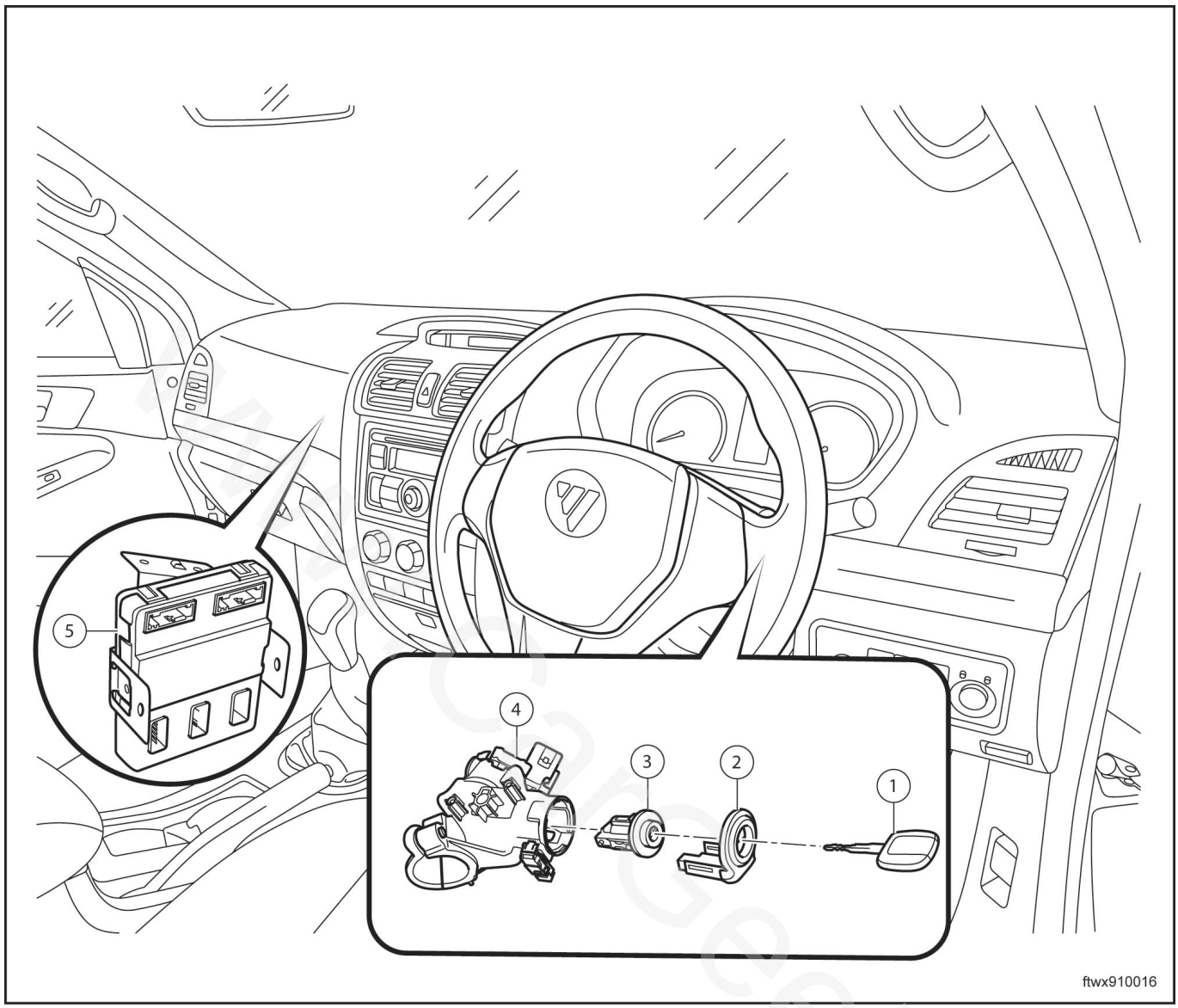
(a) When disassembling or installing any electric unit, or touching the exposed electrical terminal with tools or devices, disconnect the negative battery cable firstly, to prevent vehicle damage or personal injury.

(b) During the operation, turn off the ignition if not otherwise specified.

2 . Ignition switch representation

Ignition switch (location)	Ignition switch representation
LOCK	Ignition Switch: OFF.
ACC	Ignition Switch ACC
ON	Ignition Switch: ON.
START	Start the engine.

COMPONENTS DRAWING



1	Ignition Key
2	Ignition switch backlight
3	Ignition Switch Key

4	Ignition switch assembly
5	Body Controller

VEHICLE BODY CONTROLLER DESCRIPTION

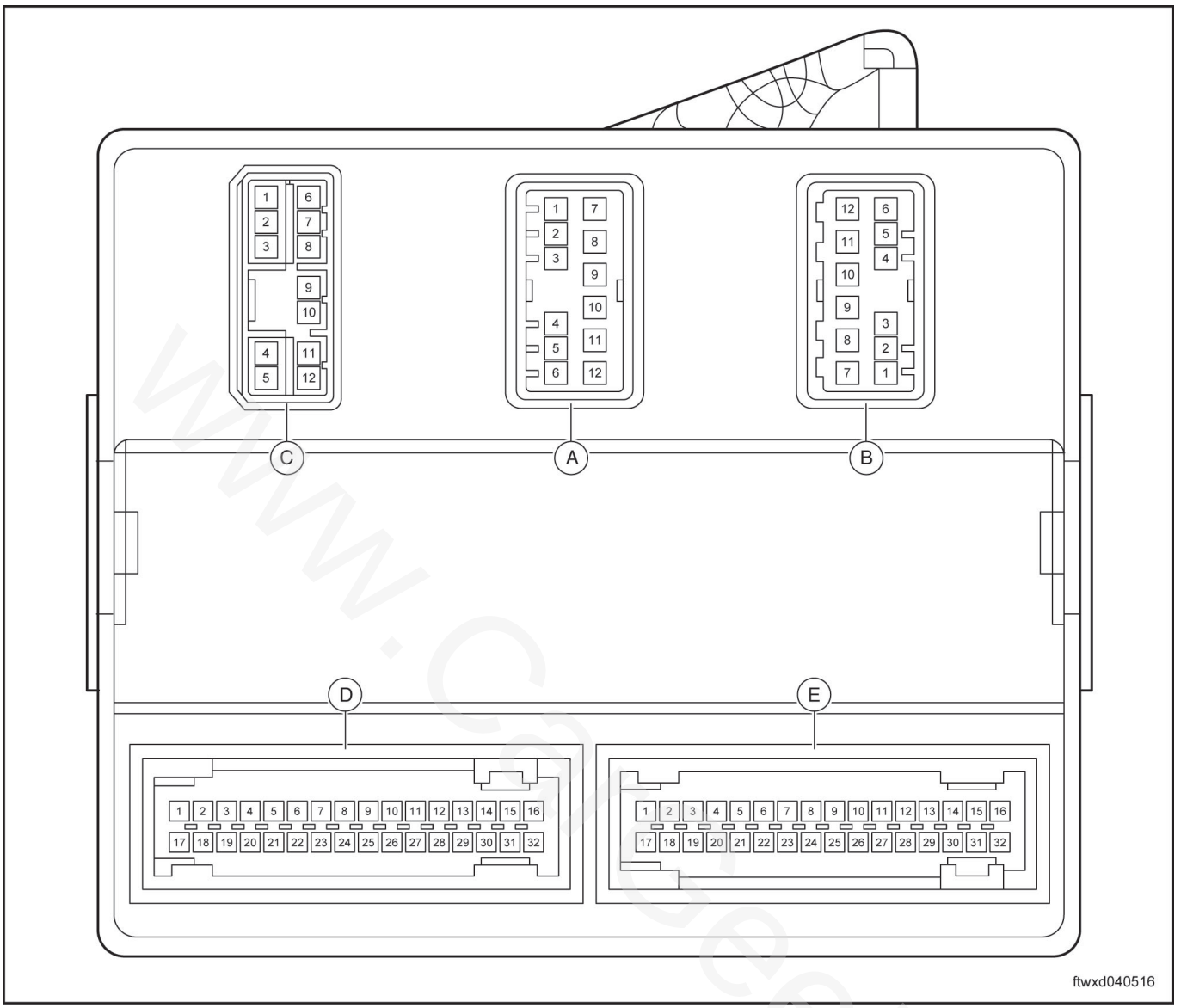
The electronic vehicle body control system of this style, in which a centralized type vehicle body controller (BCM) is adopt and car lights, door locks, wipers, car windows of the whole vehicle are intelligently controlled by a control module, is mainly used for vehicle body electric appliances control. At the same time, it has also functions such as electric appliance intelligent fault diagnosis, intelligent energy-saving and bus communication etc.

The function and function description are as follows:

Function	Description
Power supply management	Over-voltage mode
	2.Under-voltage mode
	3. Low energy consumption mode
Remote controller matching	Activate the matching function of the remote controller through the printing and writing system
Vehicle anti-theft alarm	1.Early warning
	2. Setting up defences
	3. Relieving defences in two stages
	4. Secondary anti-theft
Door lock Control	1.Central controlled locking
	2. Central controlled unlocking (including automatic un-locking function through colliding)
	3. Automatic locking
	4.Door lock shall be used firstly
	5.Mechanical unlocking / locking
Car window control	1.Roll up/down car window manually
	2.Close window through remote control
	3.Anti-pinching window
Prompts and alarms.	1.prompt that small light has not been turned off
	2. Prompt that door has not been closed
	3.Prompt that the key has not been pulled out
Function of memory of anti-theft (power failure)	BCM will get back to under the mode before power failure if after power supply is restored
Car lights control	1.Switch control for internal and external lights(small light,headlight low beam, high beam, high beam flashing, turn light, step lamp, front and rear foglight, backup door light, daytime travel light)
	2. automatic on / off (reading lamp, ignition lock lighting)
	3.Lights which is followed for going home
	4.lights for seeking car
	5.Turn light fault detection
	6.Hazard warning lamp function

Function	Description
Wiper water -sprayer	1.Run at a high speed
	1.Run at a low speed
	3.Removing the mist
	4.Intermittent running
	5.Washing / wiping
Defrosting	Rear-view mirror defrosting
	2.Rear windscreen defrosting
Diagnosis	Diagnosing through CAN bus
LIN communication	Car window anti-pinching module is controlled through LIN line to form communication with the central display

DEFINITION FOR THE VEHICLE BODY CONTROLLER PIN



Connector A

Terminal no.		Connection rod color	Description
C032	A1	Purple	Ceiling lamp
	A2		The front axle clutch outputs signal
	A3		—
	A4		—
	A5		—
	A6		—
	A7	Red	Left rear window drops
	A8	Blue	Left rear window rises

Terminal no.		Connection rod color	Description
	A9	Grey - red	assistant driver’s car window drops
	A10	Grey	assistant driver’s car window rises
	A11	brown	Driver’s car window drops
	A12	brown	Driver‘s car window rises

Connector B

Terminal no.		Connection rod color	Description
C033	B1	brown	Door locks
	B2	Blue	Door unlocks
	B3	Blue - black	Driver’s door unlocks
	B4		—
	B5		—
	B6	Red-blue	Rear foglight power supply+ driver’s door unlock
	B7	white	The front window power supply + central control
	B8	Purple	Rear car window power supply
	B9	Orange:	Right rear car window rises
	B10	White - red	Right rear car window drops
	B11	Black	ground
	B12	Black	ground

Connector C

Terminal no.		Connection rod color	Description
C034	C1		Right turnlight.
	C2	green	Left turnlight.
	C3	Blue	Small lamp
	C4		—
	C5	White - black	Lamp power supply 2
	C6	Black-Red	Lamp power supply 1
	C7		Rear wiper
	C8	Red-white	Rear foglight
	C9		—
	C10	White - red	Battery power-saving input

Terminal no.		Connection rod color	Description
	C11		—
	C12	Red-yellow	Battery power-saving output

Connector D

Terminal no.		Connection rod color	Description
C035	D1	Black - green	External antenna
	D2	Purple - white	Front wiper switch(low-speed)
	D3	Purple - green	Front wiper switch(high-speed)
	D4	Purple -yellow	Front wiper switch(intermittent)
	D5		Horn switch
	D6	Yellow-black	(Driver's door) unlock/unlock switch
	D7	White - brown	Left rear car window switch
	D8	White - orange	Right rear car window switch
	D9	White - red	Passenger seat car window switch
	D10	White - black	(Driver’s door)left rear car window switch
	D11	Blue-yellow	(Driver’s door)right rear car window switch
	D12	Orange - black	(Driver’s door)passenger seat car window switch
	D13	White - green	(Driver’s door) passenger seat side car window switch
	D14	Orange:	High beam
	D15	Purple -red	aLow beam
	D16	White - violet	Front foglight（DRL)
	D17		Safety indicating lamp
	D18	Red	Althorn/bass Horn
	D19	Red-white	CAN H
	D20	Blue-yellow	CAN L
	D21	Brown - white	Rear windscreen defrosting unit.
	D22	Grey -purple	Rear-view mirror defrosting
	D23	green	Front wiper (low-speed)

Terminal no.		Connection rod color	Description
	D24	Yellow - red	Front wiper (high-speed)
	D25		Signal for closing remote control skylight
	D26		Request switch for electrical air conditioner.
	D27		Medium-voltage switch for electrical air conditioner.
	D28		Auto-dimmer switch
	D29		
	D30		
	D31		LIN
	D32	Purple - pink	LIN

Connector E

Terminal no.		Connection rod color	Description
C036	E1	Red	ACC
	E2		KEY IN
	E3	Orange - red	IGN
	E4		Rear wiper switch
	E5	Black - white	Small lamp switch
	E6	Light green	Low beam switch
	E7	Blue-red	High beam switch
	E8	green	Flash on/off switch
	E9	Blue	Front foglight switch
	E10	Blue - white	Rear foglight switch
	E11	Red-blue	Left turn light switch
	E12	Green-red	Right turn light switch
	E13	Grey	Hazard warning lamp switch
	E14	White -pink	Passenger car window prohibition
	E15	Yellow - green	Left front car door switch
	E16	Purple	Right front car door switch
	E17	Blue	Left rear car door switch
	E18	Yellow-black	Right rear car door switch
	E19		Engine bonnet ajar input
	E20		Trunk door opens
	E21		Rear-view mirror defrosting unit switch.

Terminal no.		Connection rod color	Description
	E22		Reverse switch
	E23		Rear wiper stop position switch
	E24	brown	Front wiper stop position switch
	E25		Rear washer switch
	E26	Green - white	Front washer switch
	E27	Orange:	(Mechanical key) door un-locking switch
	E28	Blue - black	(Mechanical key) door locking switch
	E29	Yellow - red	Rear defrosting unit switch.
	E30	Yellow - red	Mechanical key anti-unlock-ing switch
	E31		Snowfield mode switch
	E32		Motion mode switch

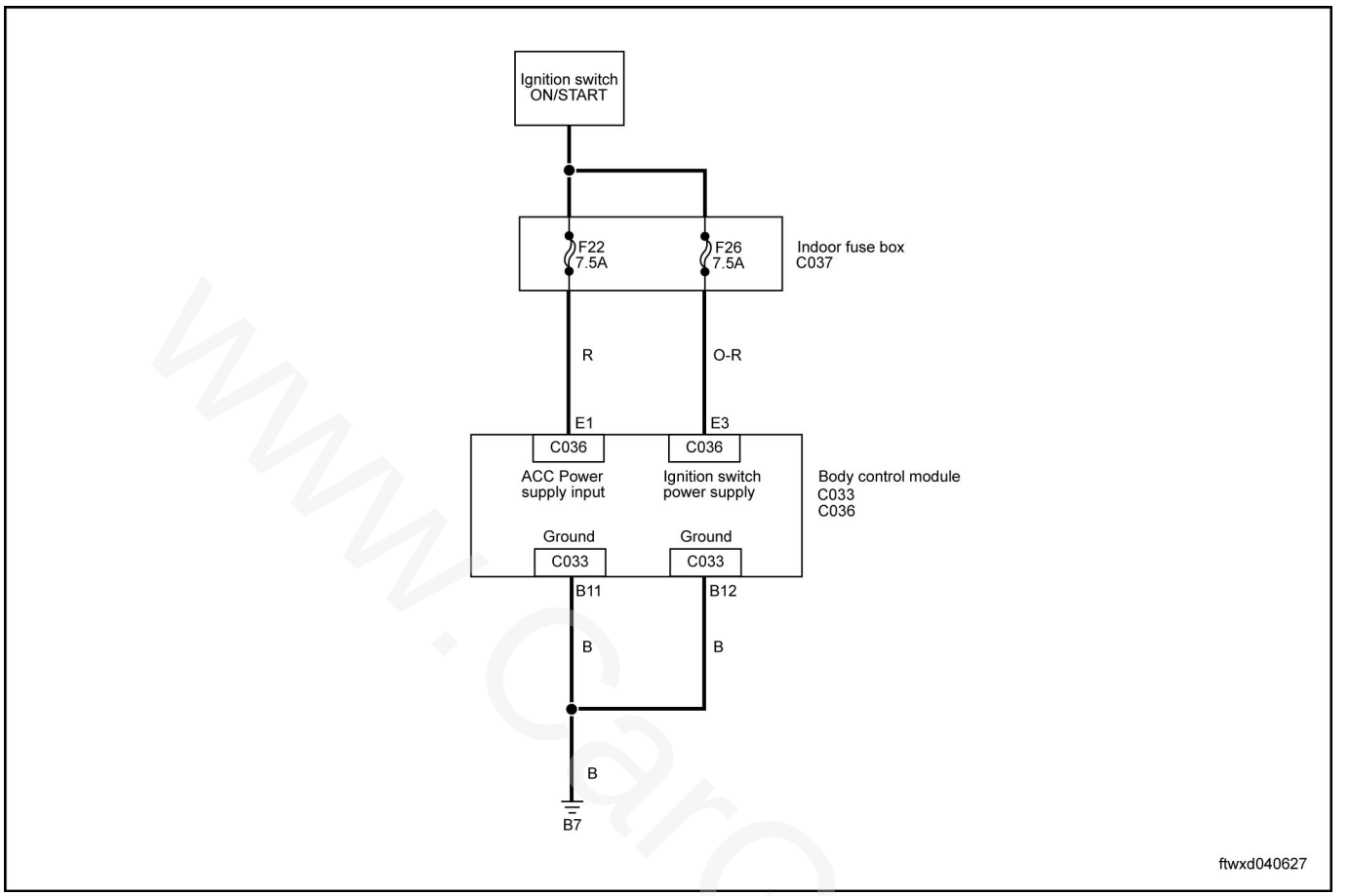
DEFECT PHENOMENON FORM

When checking DTC in the checking module, if certain DTC displayed, then the circuit of the code listed in the following list should be checked. The detailed description of each DTC can refer to corresponding pages.

DTC code	Diagnostic items (DTC definition)	Trouble location
B353C	The power supply is greater than 16V within BCM	• Battery • Charging system • Systematic power supply • Body Controller
B353D	The power supply is smaller than 9V within BCM	• Battery • Charging system • Systematic power supply • Body Controller
B1402	Battery energy-saving outputs circuit low-voltage	• Battery • Charging system • Systematic power supply • Body Controller
B1403	Battery energy-saving outputs circuit high-voltage	• Battery • Charging system • Systematic power supply • Body Controller

B353C THE POWER SUPPLY IS GREATER THAN 16V WITHIN BCM
B353D THE POWER SUPPLY IS SMALLER THAN 9V WITHIN BCM

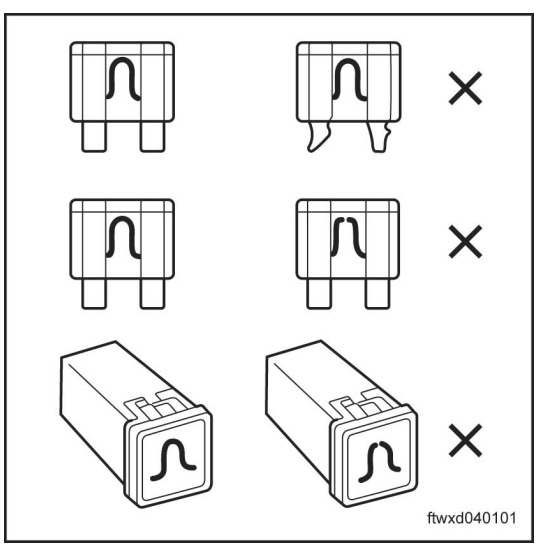
Circuit Diagram



Diagnostic step

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse in the indoor fuse box.

- F22(7.5A)
- F26(7.5A)

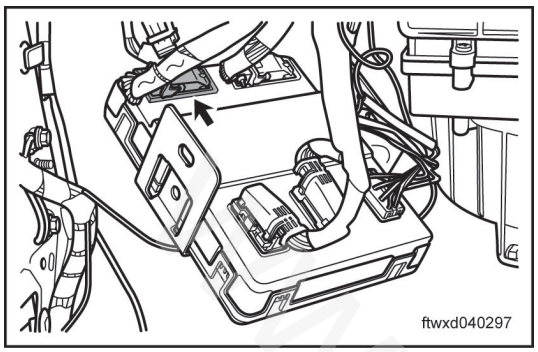
Check whether the result is normal?

Yes> go to step 2

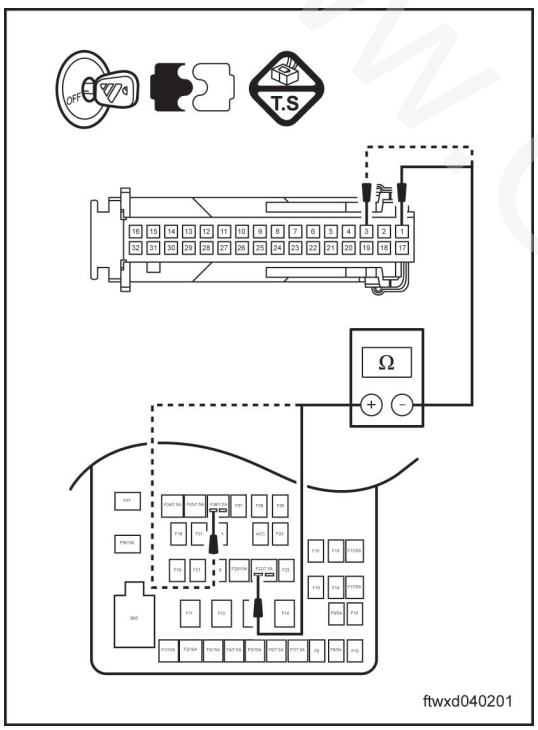
No> replace fuse

2 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C036 of BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Multimeter connection	Standard value
F22(7.5A)-C036（E1）	＜2 Ω
F26(7.5A)-C036（E3）	

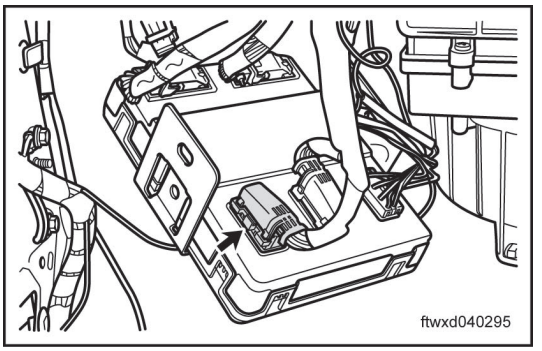
Check whether the result is normal?

Yes> go to step 3

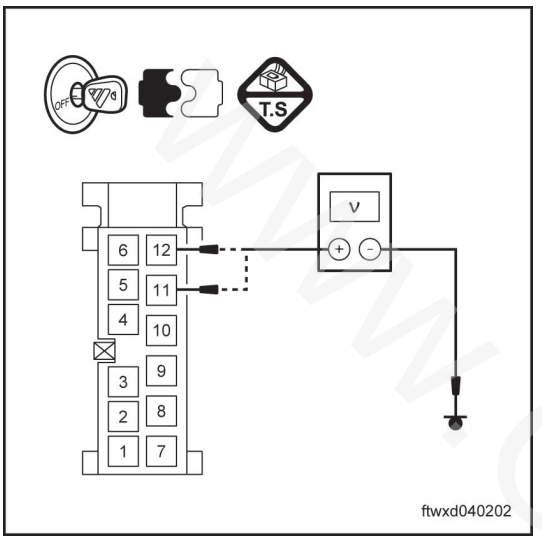
No > Maintenance or replace harness.

3 . Check the harness and connectors (BCM controlling unit -grounding)

(a) Ignition Switch: OFF.



(b) Disconnect the connector C033 of BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Multimeter connection	Standard value
C033（B11) - grounding	＜2 Ω
C033（B12) - grounding	

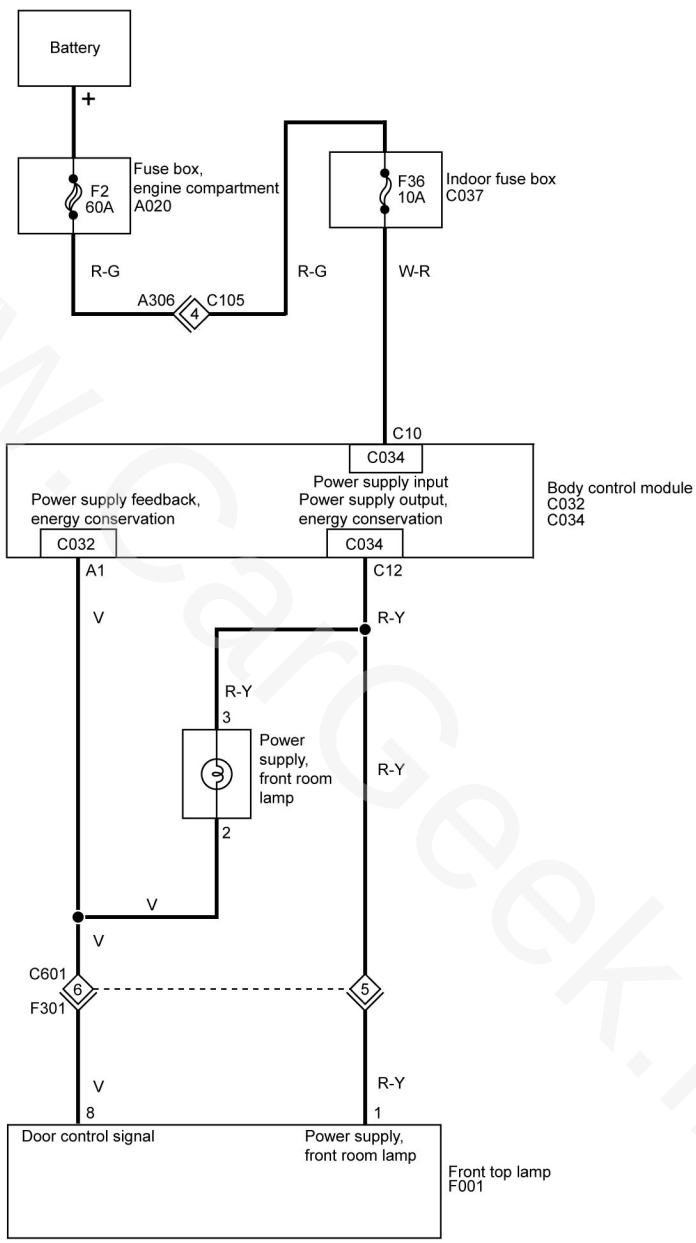
Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

B1402 BATTERY ENERGY-SAVING OUTPUTS CIRCUIT LOW-VOLTAGE
B1403 BATTERY ENERGY-SAVING OUTPUTS CIRCUIT HIGH-VOLTAGE

Circuit Diagram

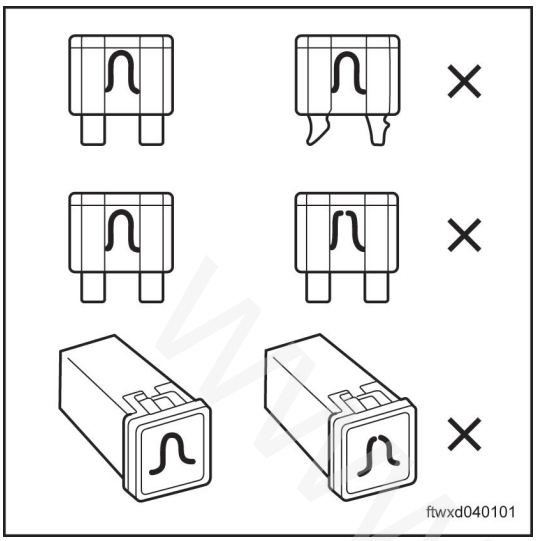


ftwxd040583

Diagnostic step

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check fuse inside fuse box, engine compartment : F11 (60A).

(c) Check the fuse F36（10A) in the indoor fuse box.

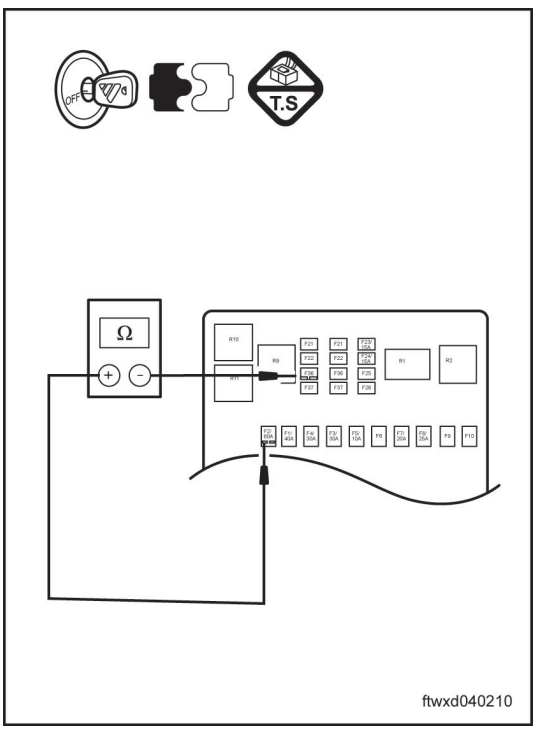
Check whether the result is normal?

Yes> go to step 2

No> replace fuse

2 . Check the harness and connectors (fuse - fuse).

(a) Disconnect battery negative cable.



(b) Measure the resistance as per the values given in the table below

Multimeter connection	Standard value
F2(60A)-F36(10A)	＜2 Ω

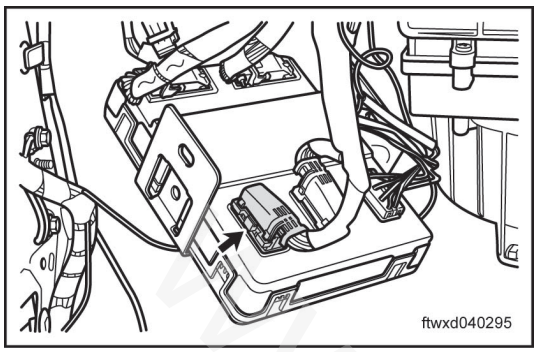
Check whether the result is normal?

Yes> go to step 3

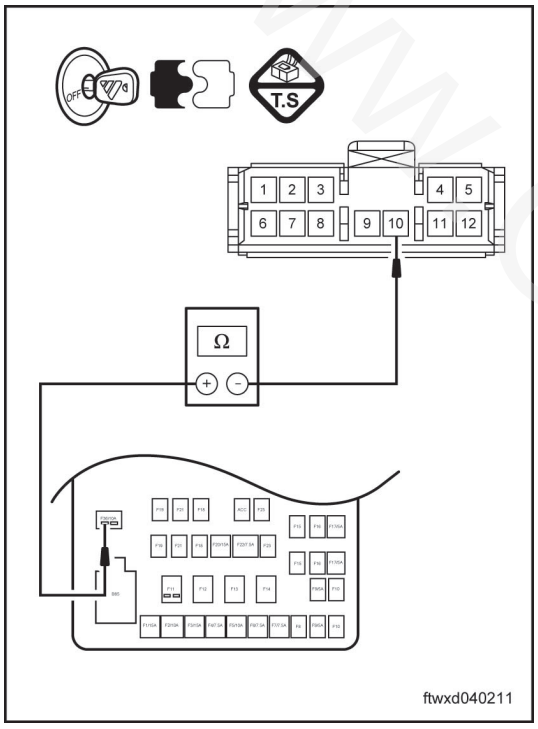
No > Maintenance or replace harness.

3 . Check the harness and connector (fuse-BCM control unit)

(a) Disconnect battery negative cable.



(b) Disconnect the connector C034 of BCM control unit.



(c) Measure the electrical resistance based on the value in the following form.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection stitch	Specified value
F36(10A) - C034（C10）	＜ 2 Ω

Check whether the result is normal?

Yes> Replace BCM control unit.

No > Maintenance or replace harness.

TYRE PRESSURE MONITORING SYSTEM

PRECAUTION

1 . Install the tyre pressure monitoring sensor into the inflating valve installing position of spoke and check whether it has matched the surface of installation.

2 . Tyre pressure monitoring module shall be placed correctly, the module main body shall be vertical to the wheel central face, so as to avoid interfering with it while installing the outer tube afterwards.

3 . While installing the tyre pressure monitoring module and tyre, rude operation is forbidden, so as to avoid damaging the module.

4 . While assembling the tyre, tyre installation apparatus needs to be far away from the inflating valve to avoid damaging tyre pressure monitoring module.

5 . While installing the tyre pressure monitoring module and inflating valve , pulling in force shall be (250-600)N, and pulling off force shall be greater than 750N.

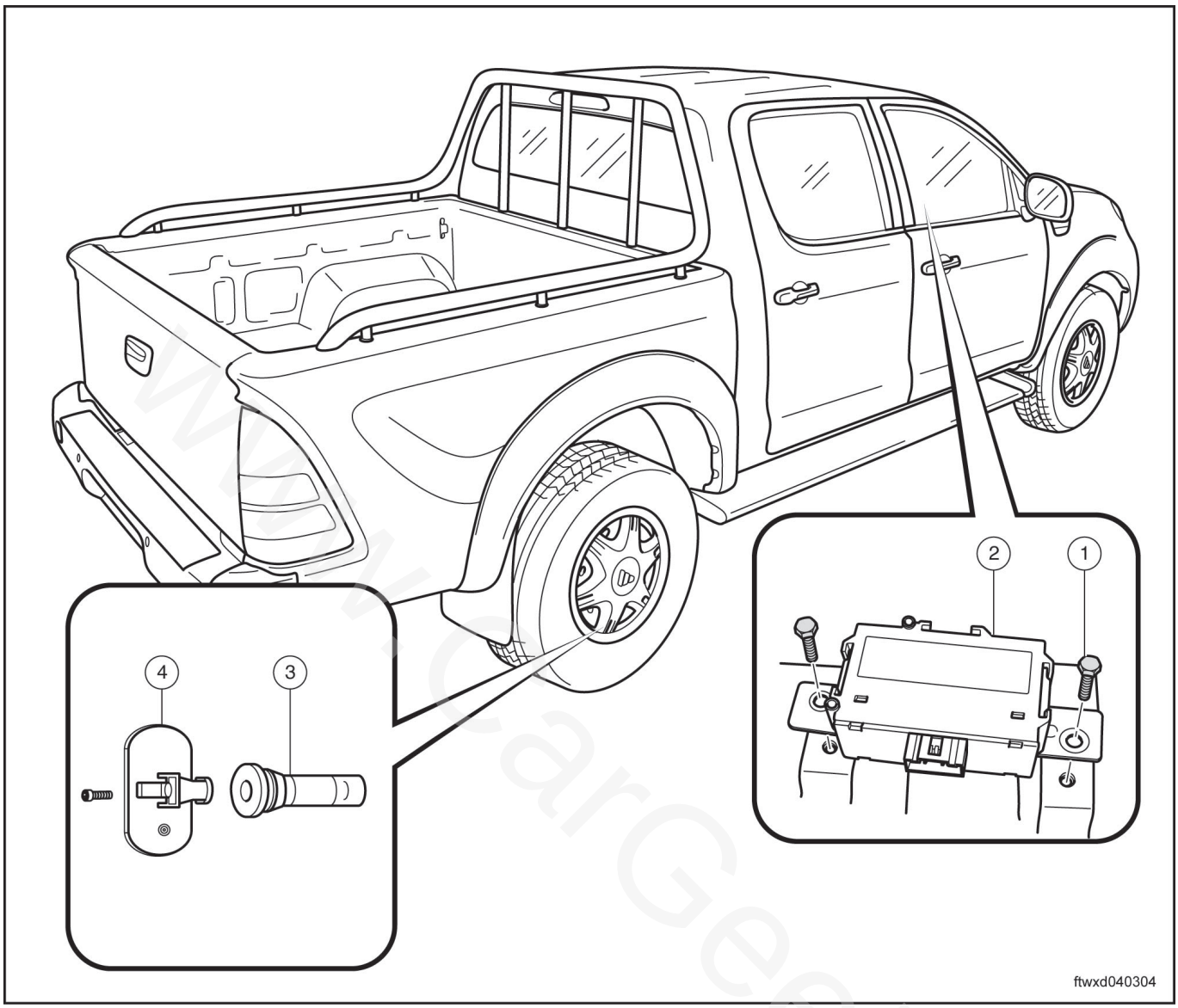
6 . When installing the tyre pressure monitoring module and inflating valve , attention shall be paid to that the rubber seat is installed vertical to the inflating valve , so as to avoid damaging the rubber.

7 . The installation of tyre pressure monitoring module involves the tyre, which will affect the security of complete vehicle. Therefore, the installation must be operated by professional personnel to guarantee that no damage to the tyre and no leaking etc. Finally, tyre dynamic balancing must be carried out.

8 . The inflating valve needs to be installed while aligning the white or yellow dot of the tyre side.

9 . Carry out dynamic balancing of the tyre, it is required that: residual unbalance for steel wheel assembly to be less than or equal to 11g; while residual unbalance for aluminium wheel assembly to be less than or equal to 5g.

COMPONENTS DRAWING



1	Fixing screw for tyre pressure monitoring controller
2	Tyre pressure monitoring controller

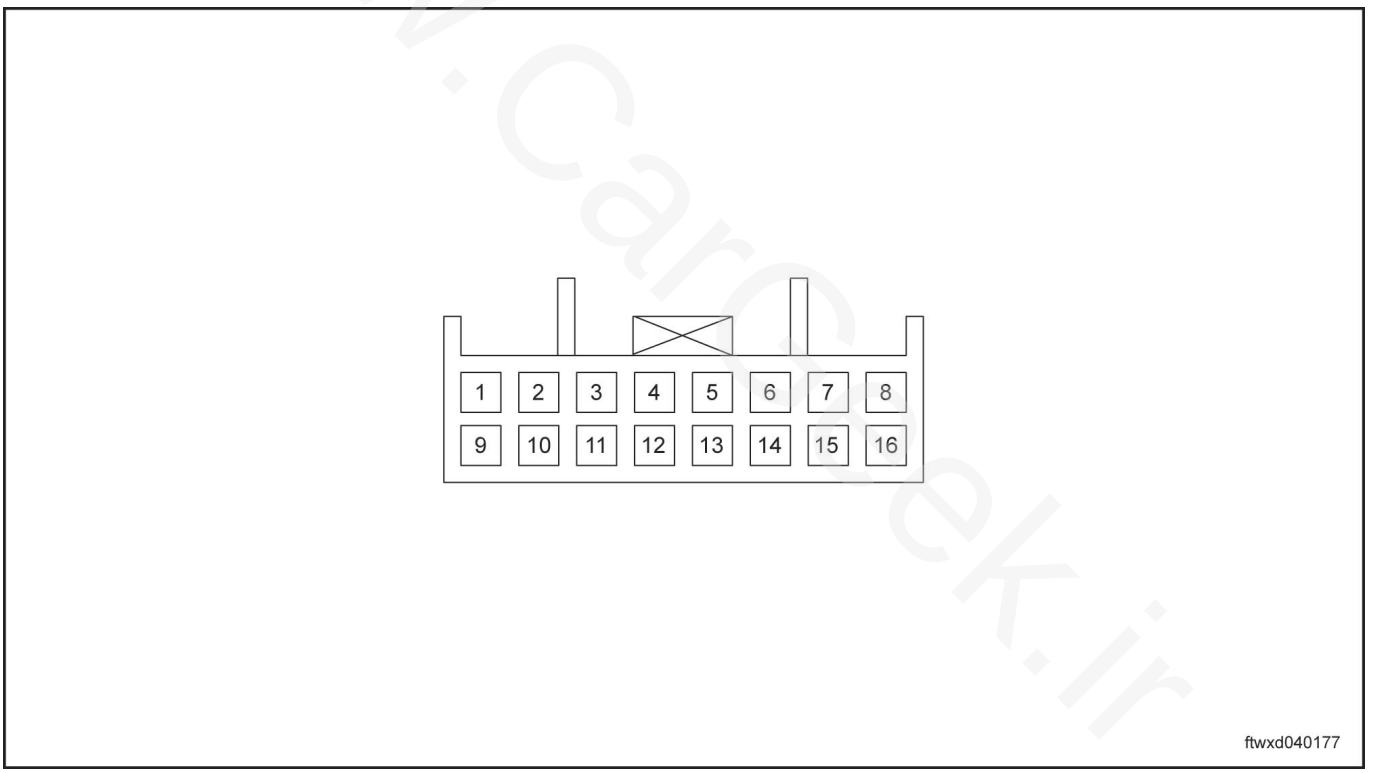
3	Inflating valve
4	Tyre pressure monitoring module

SYSTEM SPECIFICATION

1 . Technical specifications:

Item	parameters.
Standard voltage	DC12V
Operating voltage	DC9~16V
Operating temperature	-30℃～80℃
Storage temperature range	—40℃～85℃
Working frequency range	422.92MHz ±100KHz
Low frequency controlling distance	≤15cm
Working current（IGN ON）	22mA ±3mA
Static average current (IGN ON)	≤3mA
High frequency receiving sensitivity	Greater than or equal to - 95dBm
Modulating mode of high-frequency signals	FSK

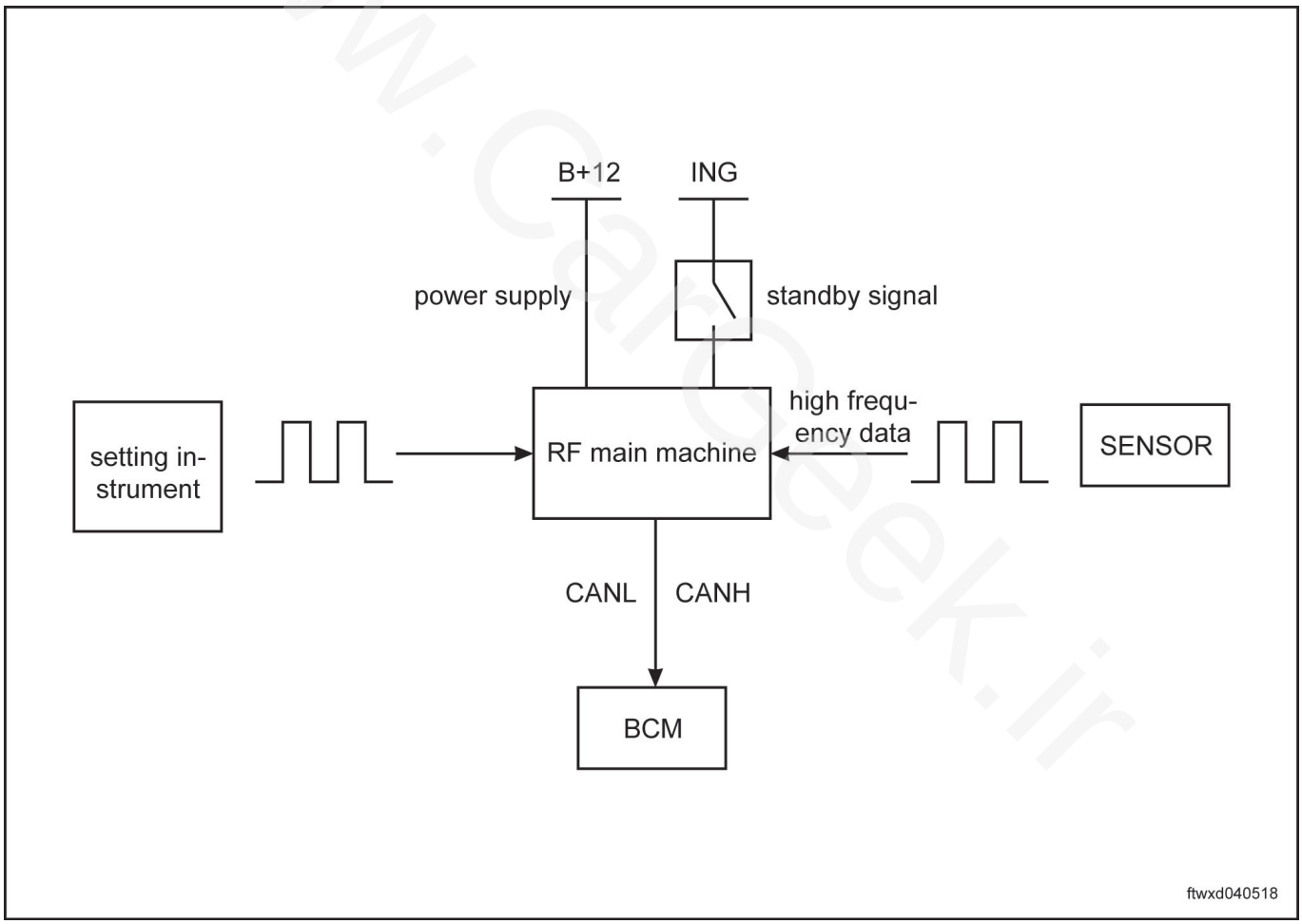
2 . Pin definition



Pin position	Function	property	Voltage
1	BAT	Input:	12V
2	(LF1)	(reserve)	/
3	(LF2)	(reserve)	/
4	/	/	/
5	IGN	Input:	12V

Pin position	Function	property	Voltage
6	/	/	/
7	/	/	/
8	CANL	Input/output	/
9	CANH	Input/output	/
10	/	/	/
11	/	/	/
12	/	/	/
13	(LF2)	(reserve)	/
14	(LF2)	(reserve)	/
15	/	/	/
16	GND	Input:	OV

3 . Function diagram



4 . System specification

(a) This system includes one receiving module and 4 tyre pressure monitoring modules.

(b) Tyre pressure monitoring module: Mounted in the vehicle tyre to monitor and control the pressure temperature information of the tyre in real time, and send the corresponding data of this information through radio frequency signal.

(c) Receiving module: Mounted in the vehicle to receive tyre pressure message which is sent by the tyre pressure monitoring module in real time; Through corresponding data processing, when the tyre present low pressure, high pressure, high temperature, fast gas leakage or the sensor does not have signal, corresponding alarm signal will be sent out in time.

(d) Moreover, the system has the function to arouse form a state of dormancy.

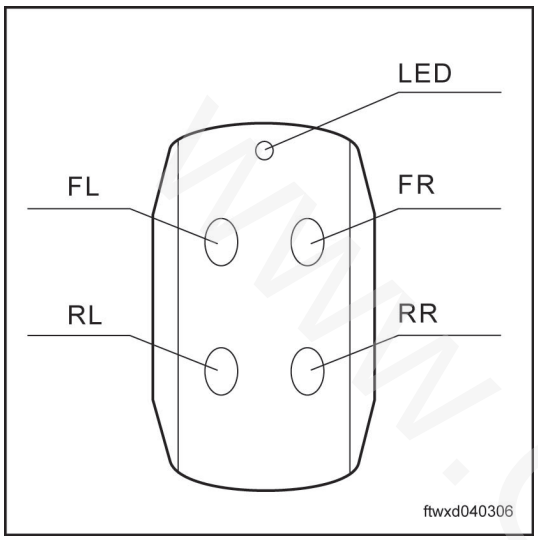
5 . Functional Description

Function	Description
Studying condition	**When IGN is ON, push down the setter for about 6s at a distance of about 10cm from the host computer, themain machine main machine will enter studying mode, studying setter will touch off SENSOR one by one to make it send out corresponding ID; The main machine will withdraw from studying mode after studying.**
Working state	**When IGN is ON, the main machine enters working state, receives the tyre pressure message and carries out corresponding data processing, outputs information such as tyre pressure, temperature through CAN.**
	When IGN is OFF, the main machine enters the power-saving mode.

TPMS SETTING METHOD

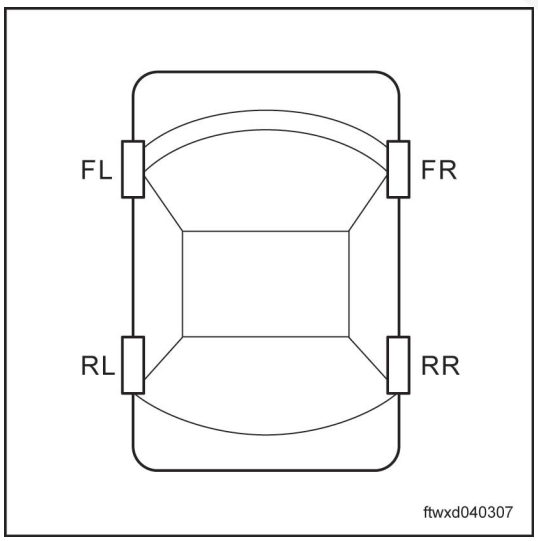
⚠ CAUTION

Tyre pressure receiving module will enter studying mode in case of any following situations: Tyre pressure receiving module has not been set 1 min after it has entered studying mode. Use setter to touch off the tyre pressure receiving module 5s later after it enters studying mode. While withdrawing from the studying mode in the both situations, please reset tyre pressure monitoring module again from the first step.

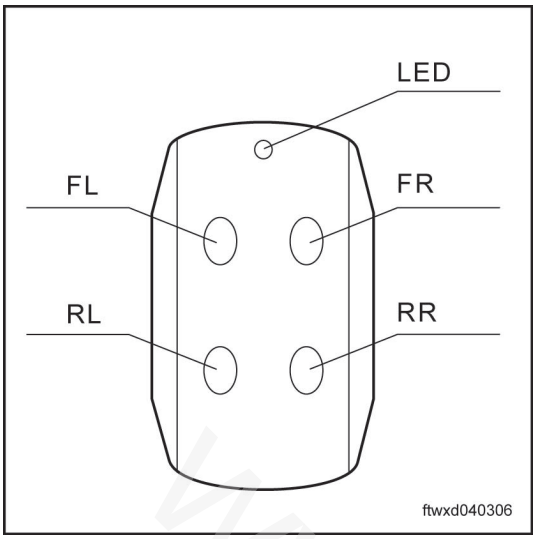


1 . Entering into the studying state.

(a) Use a hand-hold setter, with the front end(LED indicating lamp end) aiming at the tyre pressure receiving module under the left seat, press any key for about 6s at a distance of about 10cm.

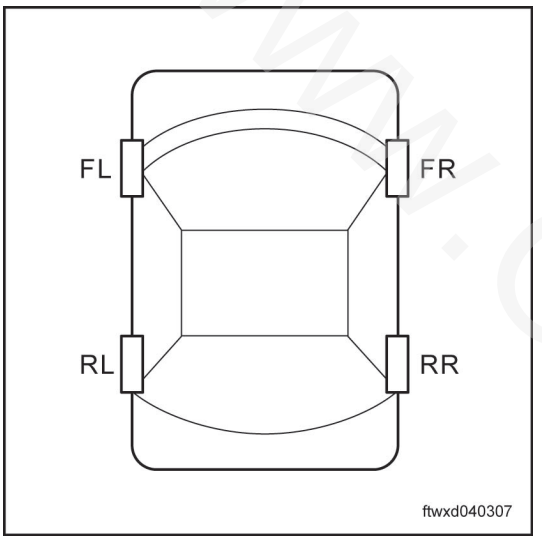


(b) Graphic patterns appear on the instrument LCD of the vehicle, showing that it has entered studying state, now loosen the button. Now the four wheels are at twinkling state.

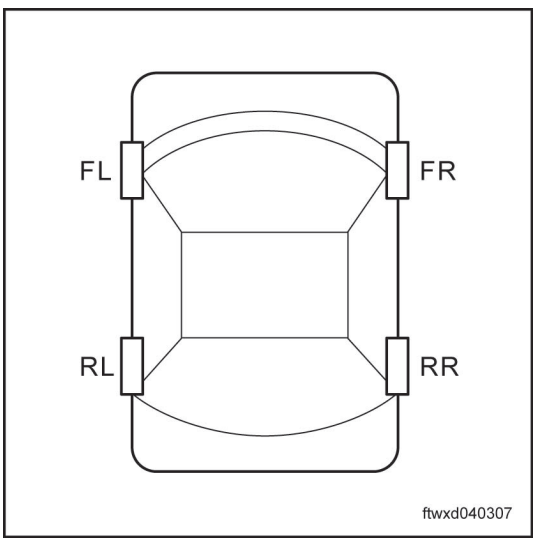


2 . Position setting

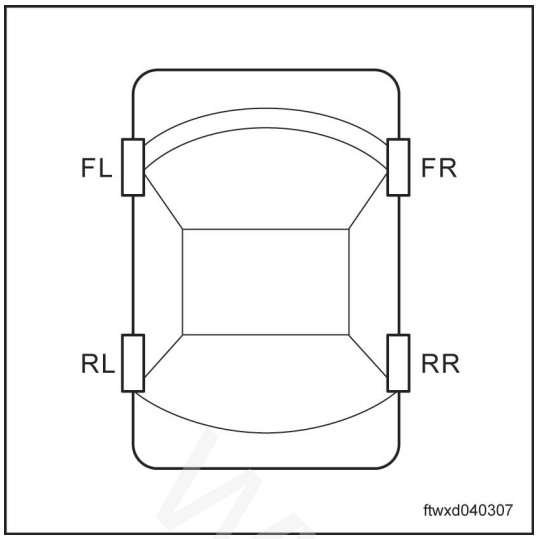
(a) Use a hand-hold setter, aim at the air valve nozzle of the tyre pressure monitoring module which need to be set, with a distance smaller than 50cm. Corresponding relation of buttons: LED indicating lamp end is the advancing direction of the car, four buttons correspond to four wheel positions separately, FL: Corresponds to the left front wheel; RL: Corresponds to the left rear wheel; FR: Corresponds to the right-front wheel; RR: Corresponds to the right rear wheel.



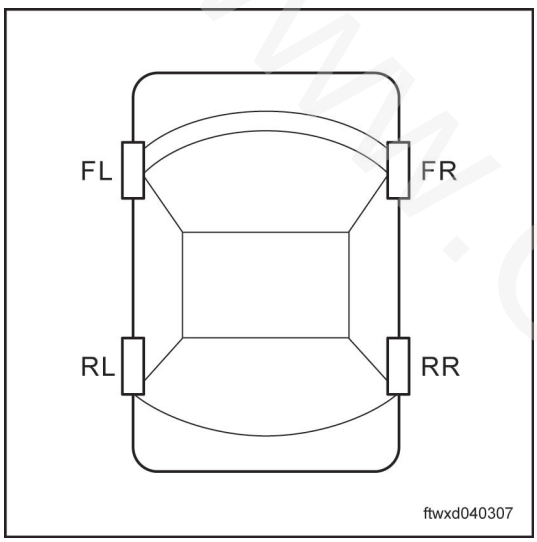
(b) Set the tyre pressure monitoring module at left-front position, press down FL button for about 3s, if the wheel corresponding to a wheel location stops flickering, setting succeeds.



(c) Alike, set the tyre pressure monitoring module at left-rear position, press down RL button for about 3s, if the wheel corresponding to a wheel location stop flickering, setting succeeds.



(d) Set the tyre pressure monitoring module at right-front position, press down FR button for about 3s, if the wheel corresponding to a wheel location stops flickering, setting succeeds.



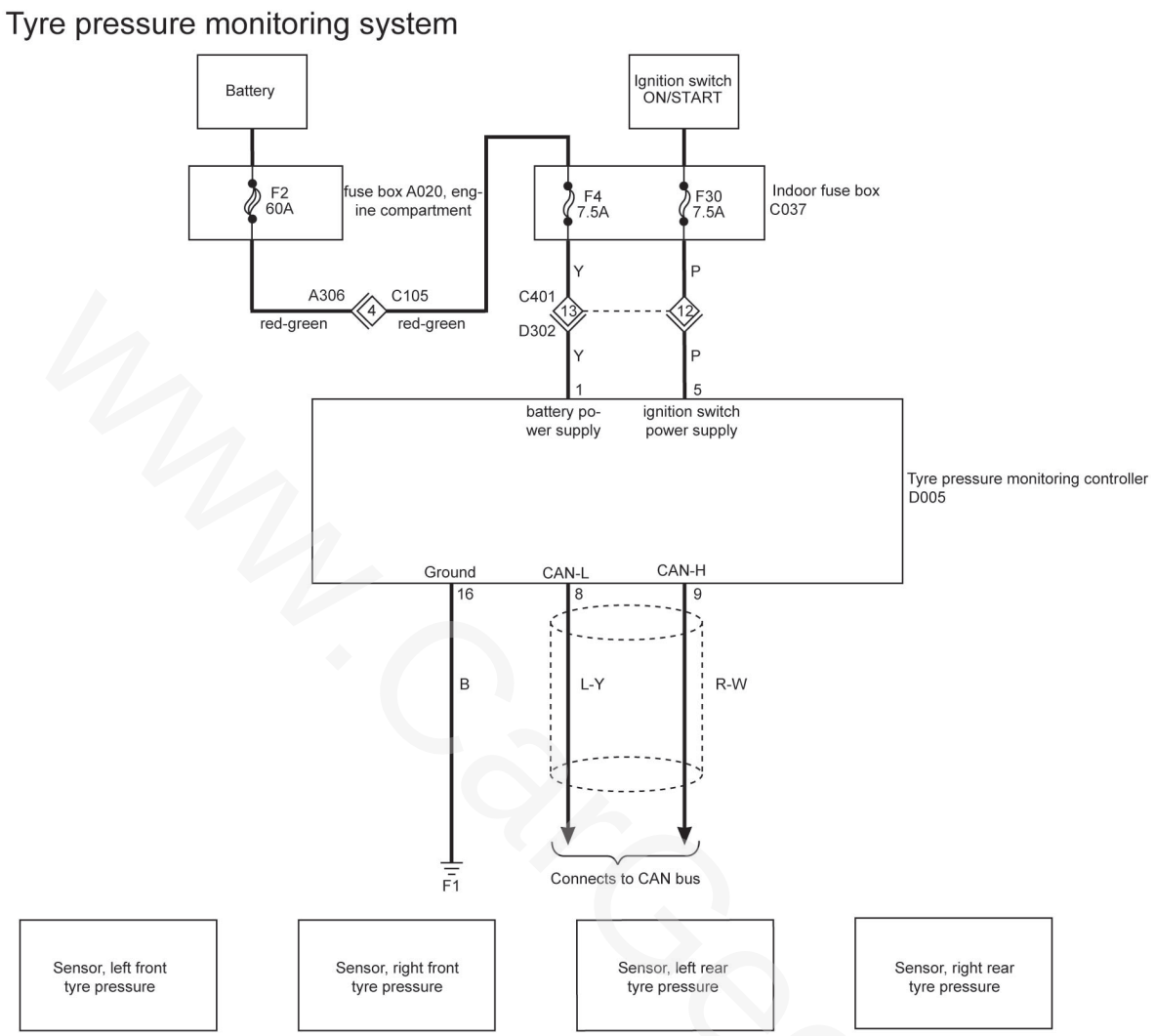
(e) Set the tyre pressure monitoring module at right-rear position, press down RR button for about 3s, if the wheel corresponding to a wheel location stops flickering, setting succeeds.

DEFECT PHENOMENON FORM

Defect phenomenon	Suspect Area	Reference
Tyre pressure monitoring controller doesn’t work	1. Fuse	-
	2.Harness and connector	-
	3. Tyre pressure monitoring controller.	Chapter 33 tyre and wheel - receiving module of the tyre pressure monitoring system, replacement
Tyre pressure is not measured correctly.	1. Tyre pressure monitoring controller.	Chapter 33 tyre and wheel - receiving module of the tyre pressure monitoring system, replacement
	2.Tyre pressure monitor.	Chapter 33. Tyre & wheel - front wheel & tyre, replacement Chapter 33. Tyre & wheel - rear wheel & tyre, replacement

TYRE PRESSURE MONITORING CONTROLLER DOESN’T WORK

Circuit Diagram



ftwxd040315

Diagnostic step

1 . Check fuse

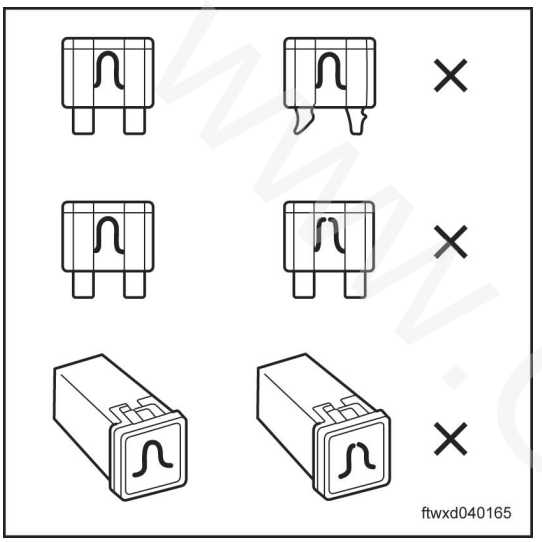
(a) Ignition Switch: OFF.

(b) Open the fuse box (A020) of the engine compartment and take out the fuse: F2(60 A).

(c) Open the indoor fuse box (C037), take out the fuses: F4（7.5 A）and F30（7.5 A）.

⚠ **CAUTION**

Dismantle of the fuse needs special fuse detacher, don’ t pull it out with hands directly in order to avoid damages.



(d) Check fuse F2 (60 A) of the engine compartment (A020), and indoor fuse box (C037) fuse: F4 (7.5 A), F30 (7.5 A).

Check whether the result is normal?

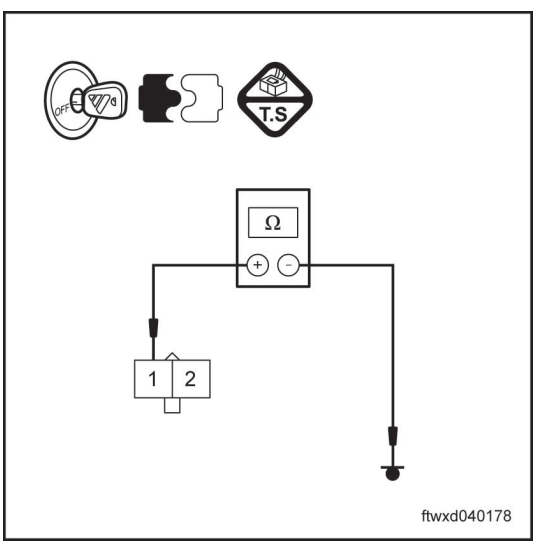
Yes> go to step 2

No> replace fuse

2 . Check harness and connector (storage battery -Tyre pressure monitoring controller)

(a) Ignition Switch: OFF.

(b) Disconnect the connectorD005 of the tyre pressure monitoring controller.



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
Battery (+) -D005（1	＜ 2 Ω

Check whether the result is normal?

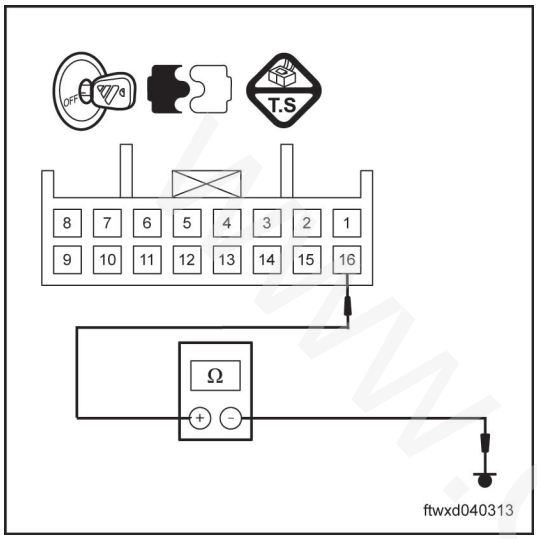
Yes> go to step 3

No > Maintenance or replace harness.

3 . Check the harness and connector (tyre pressure monitoring controller -grounding)

(a) Ignition Switch: OFF.

(b) Disconnect the connectorD005 of the tyre pressure monitoring controller.



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
D005（16）- grounding	＜ 2 Ω

Check whether the result is normal?

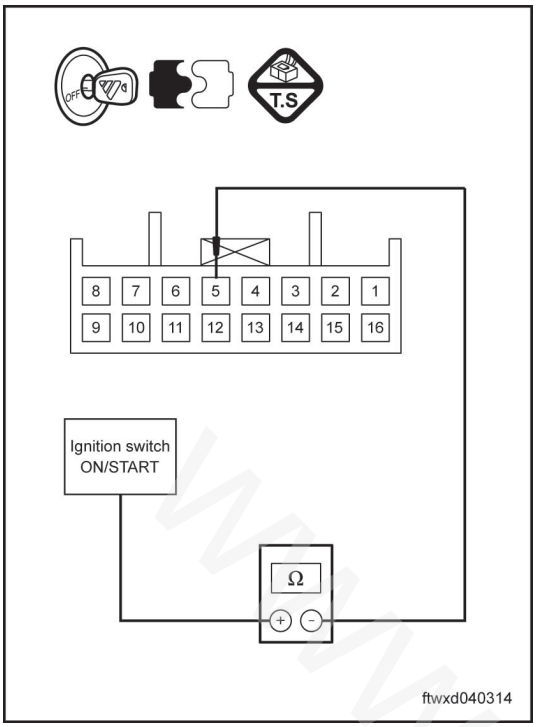
Yes> go to step 4

No > Maintenance or replace harness.

4 . Check harness and connector (ignition switch -tyre pressure monitoring controller)

(a) Ignition Switch: OFF.

(b) Disconnect the connectorD005 of the tyre pressure monitoring controller.



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
D005（5） - ignition switch.	＜ 2 Ω

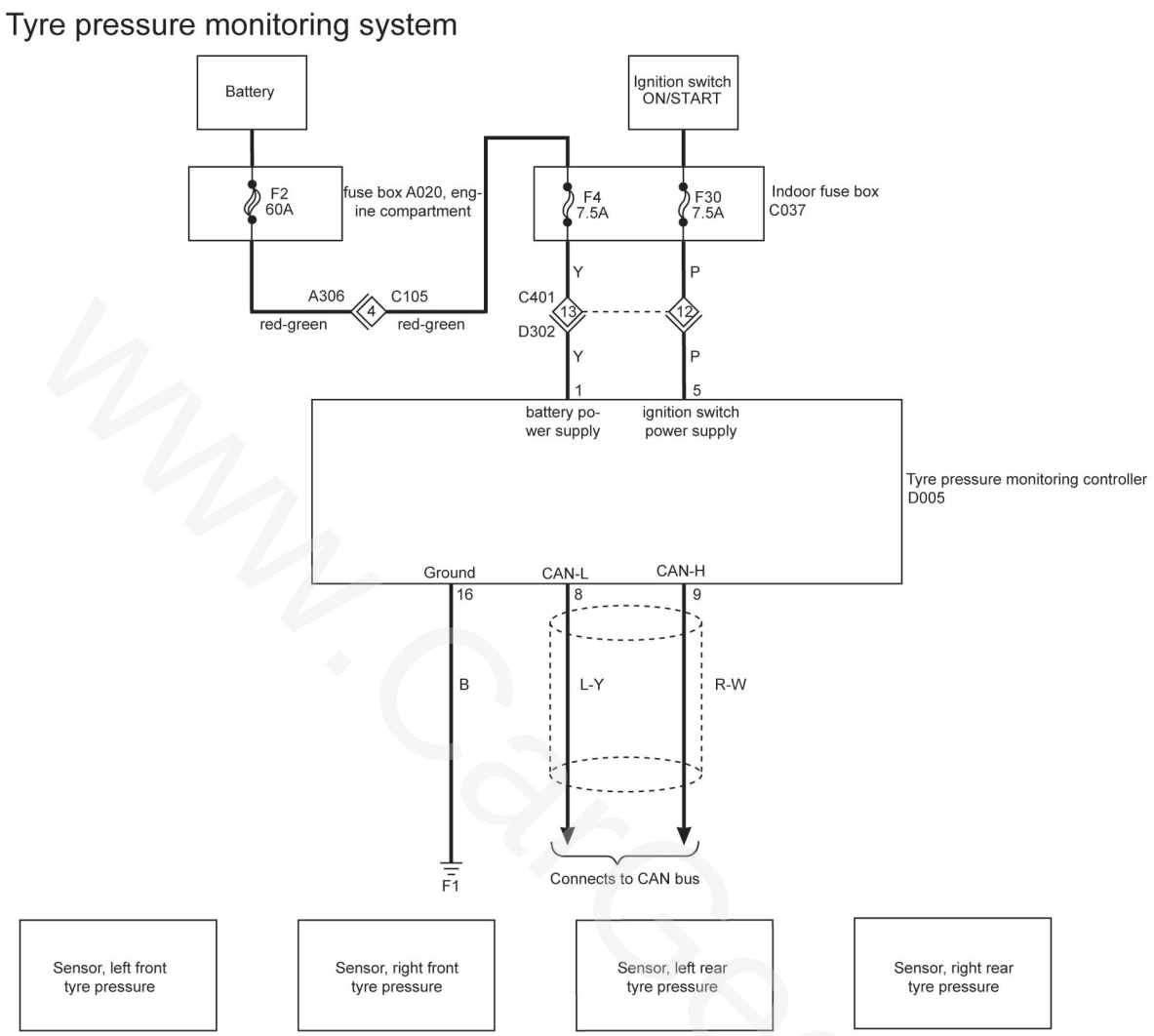
Check whether the result is normal?

Yes>Tyre pressure monitoring controller.

No > Maintenance or replace harness.

TYRE PRESSURE IS NOT MEASURED CORRECTLY.

Circuit Diagram



ftwxd040315

Diagnostic step

1 . Preset tyre pressure monitoring module

(a) Adjust the tyre pressure to the standard value.
(b) reset tyre pressure monitoring module See " Chapter 4 Diagnosis - tyre pressure monitoring system diagnosis, TPMS setting method)

Have the function returned to normal?

Yes> Complete

No> go to step 2

2 . Check the tyre pressure monitoring controller.

(a) Ignition Switch: OFF.
(b) Disconnect the connectorD005 of the tyre pressure monitoring controller.
(c) Replace the tyre pressure monitoring controller.

Have the function returned to normal?

Yes>Replace the tyre pressure monitoring controller.

No> go to step 3

3 . Check the tyre pressure monitor.

(a) Ignition Switch: OFF.
(b) Remove the tyre.
(c) Replace the tyre pressure monitor.

Have the function returned to normal?

Yes>Replace the tyre pressure monitor.

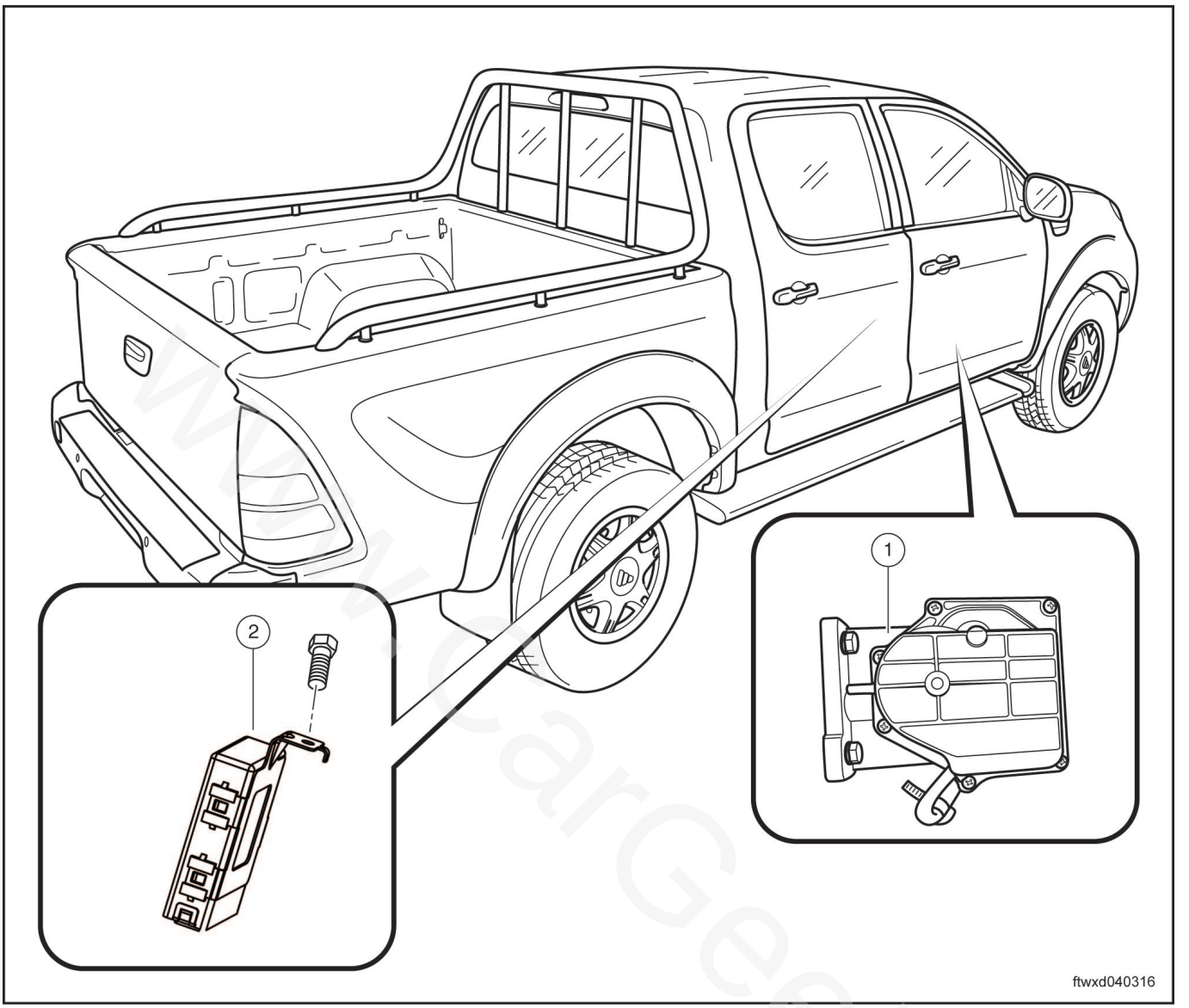
No> Remove the defects by other means.

FRONT AXLE CLUTCH

PRECAUTION

1 . **If vehicle goes greater than 80km/h, the front axle clutch controller will refuse to execute switch instruction of the four wheel driving system.**
2 . **If dynamic assembly is damaged, it is recommended that the whole assembly to be replaced, it is unsuitable to be opened and repaired.**
3 . **Maintenance shall be carried out according to the standardized steps.**
4 . **Connection in the circuit is forbidden.**

COMPONENTS DRAWING



1	Motor component of the front axle clutch
2	The front axle clutch controller

SYSTEM SPECIFICATION

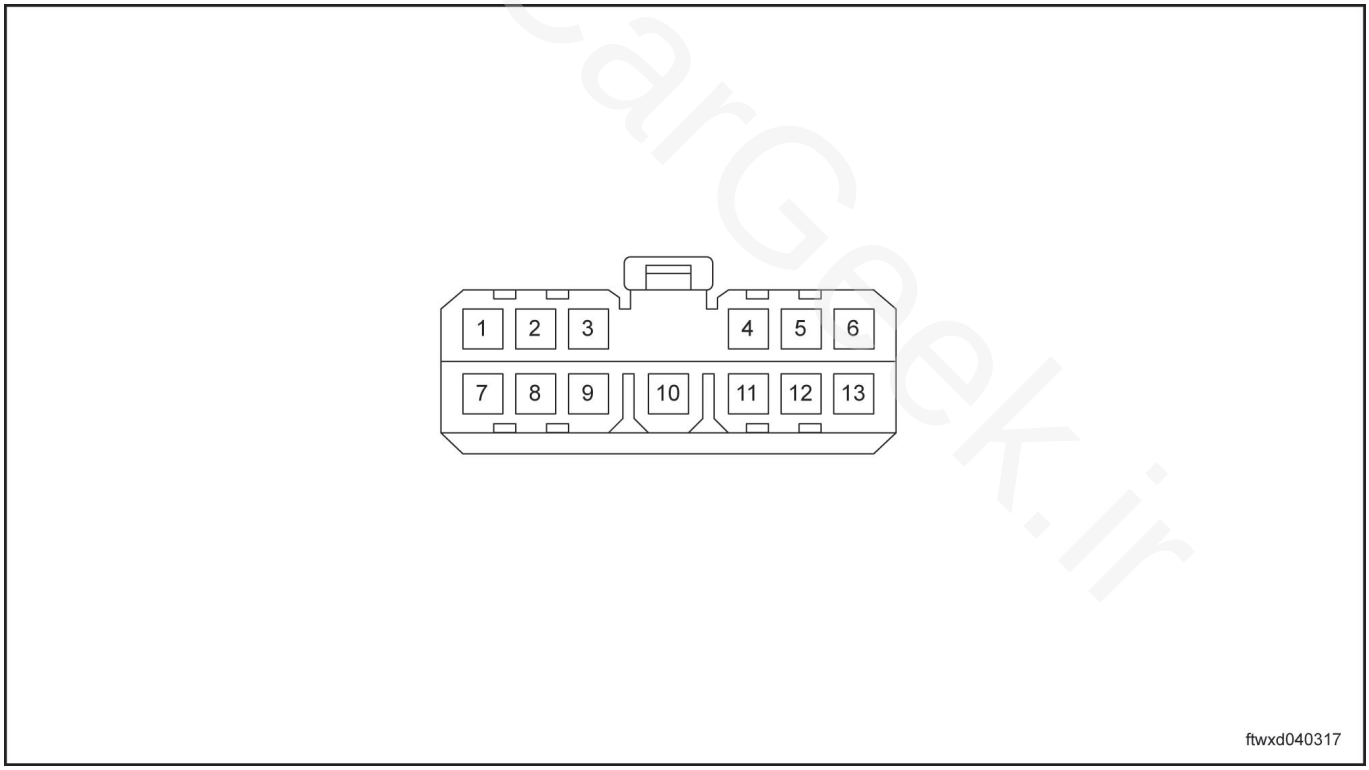
1 . PRINCIPLE OF OPERATION

(a) 2H →4H: The four-wheel driving system offers combined instruction to the front axle clutch controller, after receiving it, the front axle clutch will send corresponding instruction to the front axle clutch actuator assembly. The actuator assembly motor drives internal gears to rotate, at last, clutch shifter drives the clutch gear to match the main shaft. Feedback signal indicating that execution is finished to the four wheel driving system, at the same time switch the signal to the signal the instrument, the instrument indicating lamp shall be always on at this moment. If the first execution can’ t be finished, the front axle clutch controller will execute for the second time automatically; If the second time still can’ t be finished, the controller will feedback the information to the instrument, at this time, the instrument indicating lamp glimmers, and front axle clutch will stop.

(b) 4H →2H: The four-wheel driving system offers disconnection instruction to the front axle clutch controller, after receiving it, the front axle clutch controller will send corresponding order to the front axle clutch actuator assembly. The actuator assembly motor drives internal gears to rotate, at last, clutch shifter drives the clutch gear to disconnect with the main shaft. Feedback signal indicating that execution is finished to the four wheel driving system, at the same time switch the signal to the signal the instrument, the instrument indicating lamp shall be always off at this moment. If the first execution can’ t be finished, the front axle clutch controller will execute for the second time automatically; If the second time still can’ t be finished, the controller will feedback the information to the instrument, at this time, the instrument indicating lamp glimmers, and front axle clutch will stop.

(c) If vehicle goes greater than 80km/h, the front axle clutch controller will refuse to execute switch instruction of the four wheel driving system.

2 . The front axle clutch controller pin



Stitch number	Pin definition	Description
1	Power supply 12V(ON)	Connect to the ON line of ignition lock of car, and a 15A fuse shall be installed on the line.

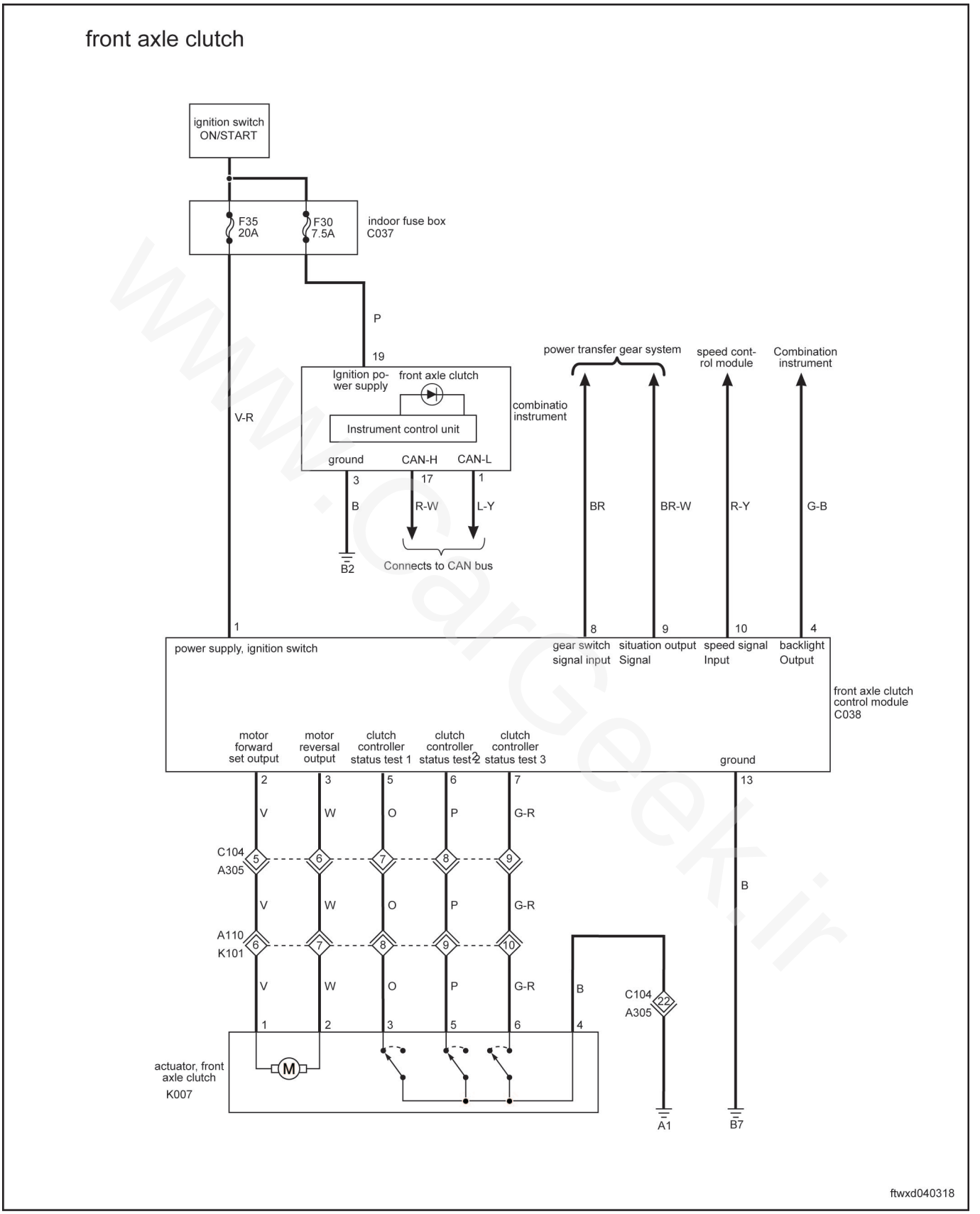
Stitch number	Pin definition	Description
2	Motor output (positive rotation)	Connect to the cable of the clutch motor, this cable will output 12V voltage when it is in 4WD →2WD and it grounds at ordinary times.
3	Motor output (reverse rotation)	Connect to the cable of the clutch motor, this cable will output 12V voltage when it is in 2WD →4WD and it grounds at ordinary times.
4	LED light output	Connect to the negative pole of LED light, and low level will be output the, the instrument indicating lamp is on.
5	Inspect the state of the clutch controller	Connect to the third pin of the clutch power assembly.
6	Inspect the state of the clutch controller	Connect to the fifth pin of the clutch power assembly.
7	Inspect the state of the clutch controller	Connect to the sixth pin of the clutch power assembly.
8	Gear switch signal input;	When the four wheel driving system ECU sends a low level signal, it shows that the front axle is required to combine; if it is not a low level , it shows that the front axle is required to be disconnected.
9	State output signal	Feedback signal which is sent to the four wheel driving system ECU. When the signal is a low level, it means that the front axle clutch has already been combined, the four wheel driving system can work normally, the instrument indicating lamp is on; When it is not a low level, it means that the front axle clutch is disconnected, indicating lamp is off; If the clutch is out of order, then the controller will directly send the unusual signal to the instrument to warn by glimmering. (The indicating lamp is controlled through the fourth pin)
10	Vehicle speed limitation signals (80km/h)	When the speed is greater than or equal to 80km/h, BCM will offer a low level (0V 2V) continuously, the controller will forbid the front axle clutch to work at this moment. Signals are cleared at ordinary times.
11	Empty:	-
12	Empty:	-
13	Cathode power supply.	-

DEFECT PHENOMENON FORM

Defect phenomenon	Suspect Area	Reference
The front axle clutch indicating lamp doesn’t work.	1. Fuse	—
	2.Harness or connector	—
	3. indicating lamp is damaged	—
Front axle clutch can't work normally	1. Fuse	—
	2.Harness or connector	—
	3 The front axle clutch actuator is of fault	Chapter 34 The axle and transmission shaft – front axle clutch assembly, replacment
	4.The front axle clutch controller module	Chapter 34 The axle and transmission shaft – front axle clutch control module, replacement

FRONT AXLE CLUTCH CAN'T WORK NORMALLY

Circuit Diagram



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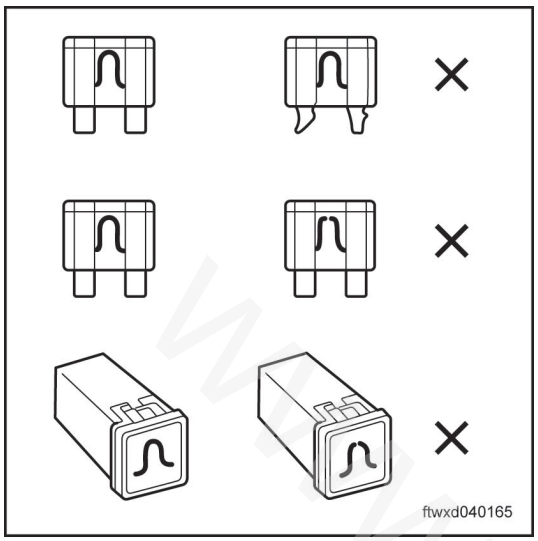
Diagnostic step

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F35(20 A) in the indoor fuse box (C037).

Check whether the result is normal?

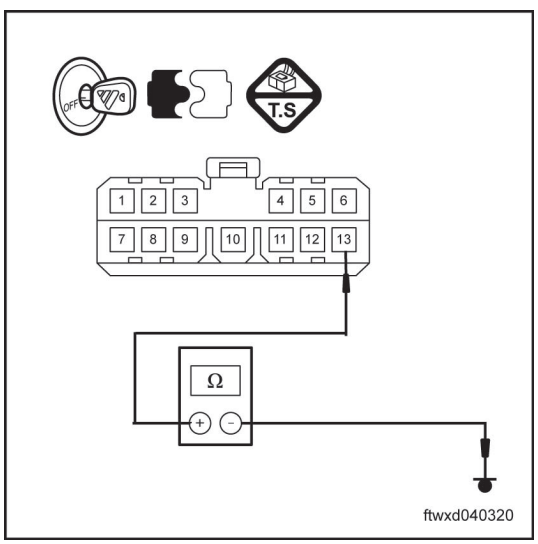
Yes> go to step 2

No> replace fuse

2 . Check harness and connectors (front axle clutch controller -grounding)

(a) Ignition Switch: ON.

(b) Disconnect the connector C038 of the front axle clutch controller.



(c) Use a multimeter to measure resistance value.

Standard voltage

Multimeter connection	Standard value
C038 (13) - grounding	Battery voltage

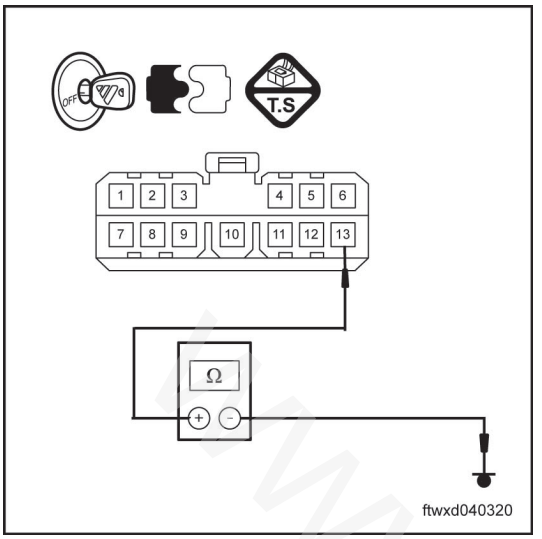
Check whether the result is normal?

Yes> go to step 3

No > Maintenance or replace harness.

3 . Check harness and connectors (front axle clutch controller -grounding)

(a) Ignition Switch: OFF.
(b) Disconnect the connector C038 of the front axle clutch controller.



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C038 (13) - grounding	＜ 2 Ω

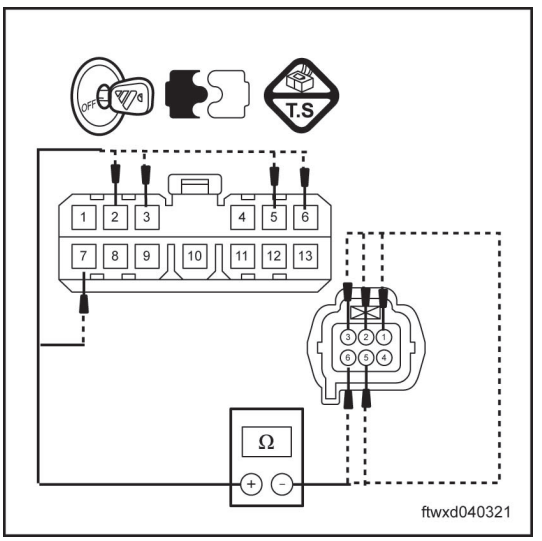
Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

4 . Check harness and connectors (front axle clutch controller - front axle clutch actuator)

(a) Ignition Switch: OFF.
(b) Disconnect the connector C038 of the front axle clutch controller.
(c) Disconnect theconnector K007 of the front axle clutch actuator.



(d) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C038 (2） - K007(1）	＜ 2 Ω
C038 (3） - K007(2）	
C038 (5） - K007(3）	
C038 (6） - K007(5）	
C038 (7） - K007(6）	

Check whether the result is normal?

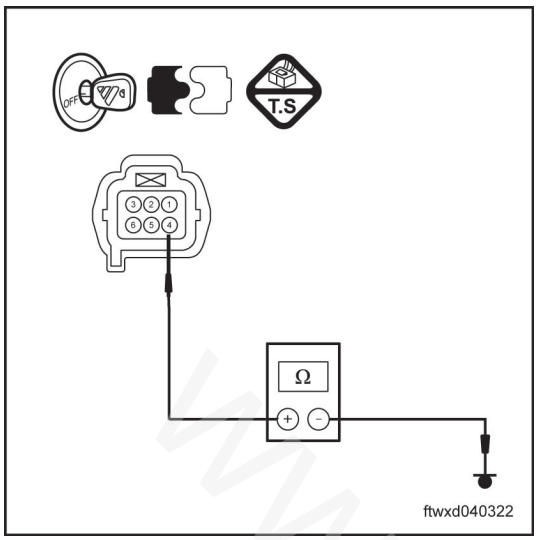
Yes> go to step 5

No > Maintenance or replace harness.

5 . Check harness and connectors (front axle clutch actuator -grounding)

(a) Ignition Switch: OFF.

(b) Disconnect theconnector K007 of the front axle clutch actuator.



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
K 007 (4) - grounding	< 2 Ω

Check whether the result is normal?

Yes> go to step 6

No > Maintenance or replace harness.

6 . Check the front axle clutch actuator.

(a) Ignition Switch: OFF.
(b) Disconnect theconnector K007 of the front axle clutch actuator.
(c) Replace the front axle clutch actuator.

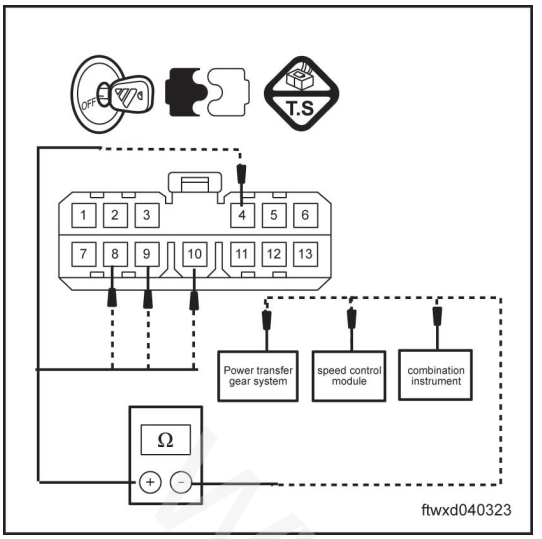
Has the fault been eliminated?

YES>replace the front axle clutch actuator.

No> go to step 7

7 . Check harness and connectors (front axle clutch controller - electrical clutch release system, vehicle speed control module, combination instrument)

(a) Ignition Switch: OFF.
(b) Disconnect the connector C038 of the front axle clutch controller.



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C038 (8, 9) – electrical separator system	< 2 Ω
C038 (10) – vehicle speed control module	
C038 (10) - combination instrument	

Check whether the result is normal?

Yes> go to step 8

No > Maintenance or replace harness.

8 . Check the front axle clutch controller.

(a) Ignition Switch: OFF.

(b) Disconnect the connector C038 of the front axle clutch controller.

(c) Replace new front axle clutch controller.

Has the fault been eliminated?

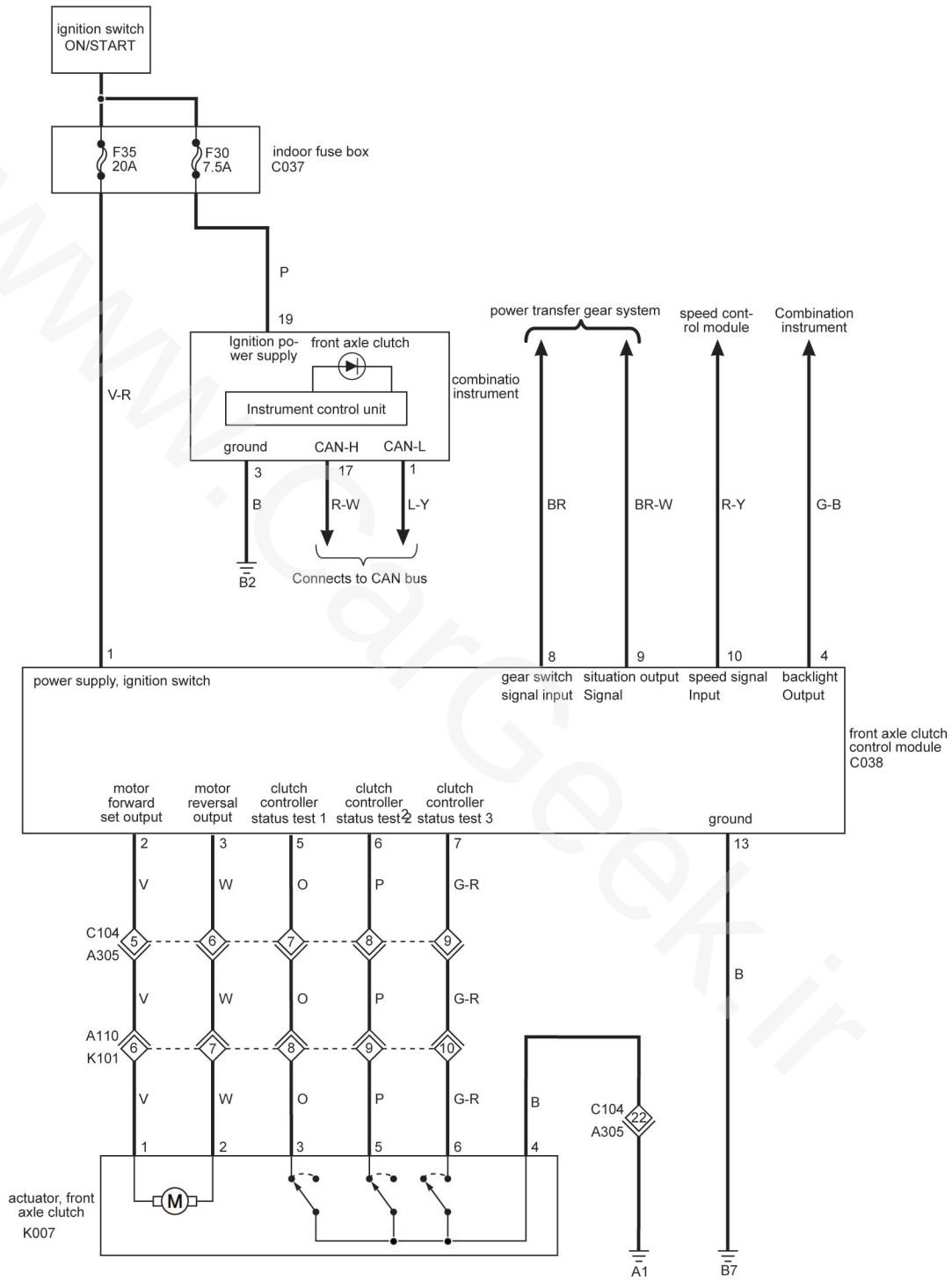
YES>replace the front axle clutch controller.

No> Remove the defects by other means.

THE FRONT AXLE CLUTCH INDICATING LAMP DOESN’T WORK.

Circuit Diagram

front axle clutch



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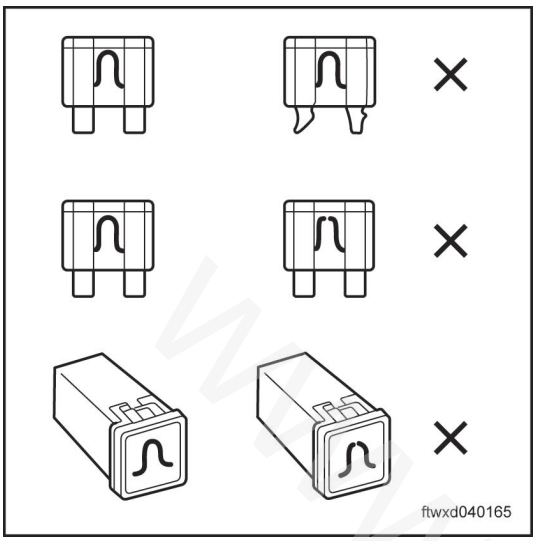
Diagnostic step

1 . Check fuse

(a) Ignition Switch: OFF.



(b) Check the fuse F30(7.5 A) in the indoor fuse box (C037).

Check whether the result is normal?

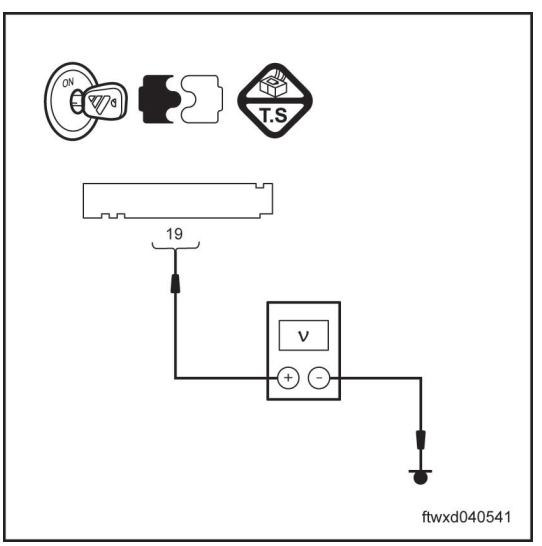
Yes> go to step 2

No> replace fuse

2 . Check the harness and connectors (combination instrument - ground)

(a) Ignition Switch: ON.

(b) Disconnect the connector of the combination instrumentC013。



(c) Use a universal meter to measure voltage

Standard voltage

Multimeter connection	Standard value
C013 (19) ground	Battery voltage

Check whether the result is normal?

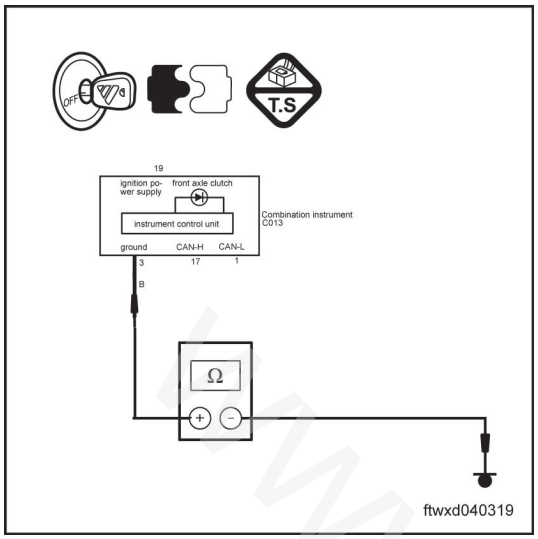
Yes> go to step 3

No > Maintenance or replace harness.

3 . Check the harness and connectors (combination instrument - ground)

(a) Ignition Switch: OFF.

(b) Disconnect the connector of the combination instrumentC013。



(c) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C013 (3) ground	＜2 Ω

Check whether the result is normal?

Yes> go to step 3

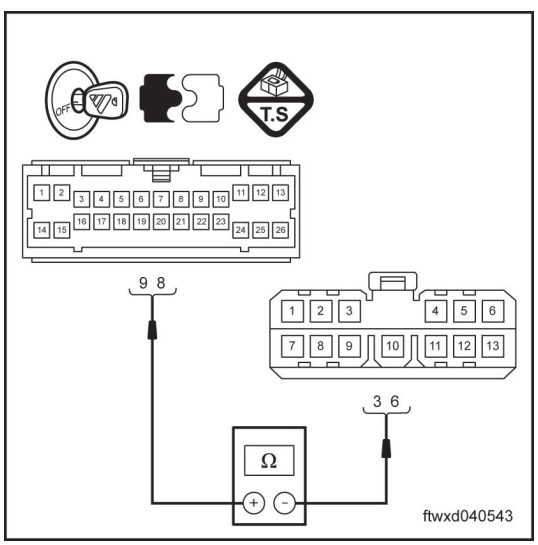
No > Maintenance or replace harness.

4 . Check the harness and connectors(Control module, front axle clutch -electric sub-actuator four wheel driving module)

(a) Ignition Switch: OFF.

(b) Disconnect the front axle clutch controller module

(c) Disconnect the electric sub-actuator four wheel driving module C040



(d) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C038（9） - C040（3）	＜2 Ω
C038（8） - C040（6）	

Check whether the result is normal?

Yes> go to step 4

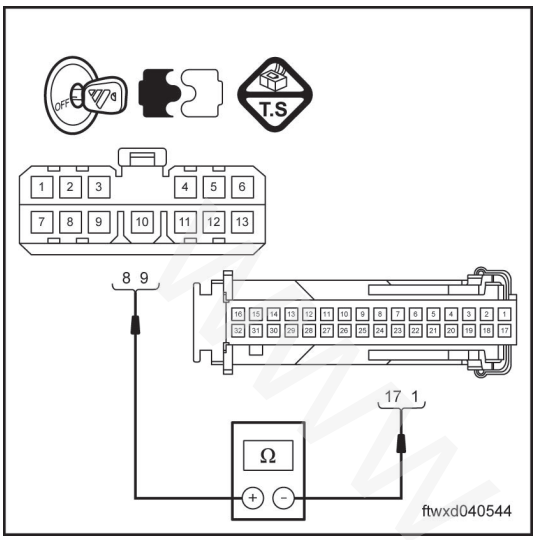
No > Maintenance or replace harness.

5 . Check wiring bunch and socket connector(combined instrument-Electric sub-actuator four wheel driving module)

(a) Ignition Switch: OFF.

(b) Disconnect assembly instrument C013

(c) Disconnect the electric sub-actuator four wheel driving module C040



(d) Use a multimeter to measure resistance value.

Standard electrical resistance (check whether there existent an open circuit)

Multimeter connection	Standard value
C013（1） - C040（9）	＜2 Ω
C013（17） - C040（8）	

Check whether the result is normal?

Yes> go to step 4

No > Maintenance or replace harness.

6 . Check indicator lamp

(a) Remove the indicator lamp

(b) Replace the indicator lamp

Check whether the result is normal?

Yes >Replace the indicator lamp

No> Remove the defects by other means.

VEHICLE MAITENANCE

SERVICE SCHEDULE

PRECAUTION

Service Precaution

1 . Safety

(a) Preparation Before Service

- If necessary, the staff shall wear safety shoes, gloves and goggles.
- Ensure the site is well ventilated and clean, and the tools and instruments are well organized. Provide fire extinguishers if needed.
- Check the safety status of the instruments and equipments, such as lifting jack.
- Check the driving and operating condition of the vehicle, to ensure smooth service.

(b) Precaution During Service

- Before the vehicle is driven into the lifting frame, ensure sufficient clearance between the frame and the bottom and sides of the vehicle, in order to prevent scratch.
- Before lifting the vehicle, ensure the weight of the vehicle doesn't exceed the rated load of the lifter.
- When lifting the vehicle, choose the right lifting points.
- During lifting, do not start the engine or engage in the gear when the driving wheels are grounded, so as to prevent potential hazards to the staff and the vehicle.
- During servicing, the staff shall strictly adhere to all safety and operawtion rules, so as to prevent potentional hazards to the staff and the vehicle.
- When replacing parts and consumables, use the products authorized by Foton, to ensure the safety and performance of the vehicle.

(c) Precaution After Service

- A trial drive is necessary after servicing, in particular focusing on the inspection of braking sytem and safety restraint system.
- The vehicle can only be handed over to the customer after the fault records in the fault memory are cleared.

2 . Schedule

(a) The interval of service and maintenance depends on mileage or time interval, whichever is earlier, as shown in the schedule.

(b) The interval to the next service shall equal to that from the last service.

(c) Refer to the service schedule for the specific service intervals of different parts.

(d) Some parts are the focuses of service. Replace any aging or damaged hose immediately. Please note that rubber hose ages over times, which will lead to inflation, scratch or crack.

(e) After a 4WD model drives through sand, soil or pond, pleasse check the following parts and service or repair them if needed.

- Brake lining and brake drum.
- Brake pad and brake disc.
- Brake pipe and rubber hose.
- Transmission, transfer case and differential oil or fluid.
- Air filter element.

Service Conditions

1 . In daily driving circumstance, follow the regular service schedule of the vehicle.

2 . If the vehicle is mainly driven in one or more special conditions as follows, some parts need service more frequently (refer to "Extreme Conditions").

(a) Road:

- Uneven, muddy or snow melting road.
- Dusty road.
- Salina road.

(b) Driving:

- Towing another vehicle or using camping rack or roof rack.
- Short distance no more than 8KM repeatedly at 0℃ or below.
- Long distance at idling or low speed, such as petrol car, taxi or door-to-door delivery truck.
- More than 2 hours at extremely high speed (80% of the maximum speed).

Note: Any information involving the code "4G69" refers to gasoline engine and "ISF2.8" refers to diesel engine.

REGULAR SERVICE ITEMS & INTERVALS

Regular Inspection & Service Checklist of 4G69 Gasoline Engine Parts

Distance and interval (in month) are indicated for each item, whichever is earlier.

I. Check, adjustment or replacement; R: Replacement, removal or lubrication; L: Lubricant; blank: N/A.

Item	Service Interval (The Earlier of Mileage Reading or Months)																		
	Months	—	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
	Mileage Reading * 1,000 KM	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Interior Check of Engine Chamber																			
Check for crack, fragment or wear in belt and adjust its tension				I		I		I		I		I		I		I		I
Engine toothed timing belt				R		R		R		R		R		R		R		R
Check crankshaft ventilation control system (including crankshaft ventilation element in air filter)						I				I				I				I
Spark Plug						R				R				R				R
Check for radiator hose damage and connection						I				I				I				I
Check engien coolant level				I		I		I		I		I		I		I		I
Engien coolant										R								R
Others																			
Replace oil	Normal condition	First 5,000KM and later every 5,000KM or every three months																	
	Extreme condition	Same mileage																	
Replacement oil filter	Normal condition	First 5,000KM and later every 5,000KM or every three months																	
	Extreme condition	Same mileage																	
Replacement gasoline filter	Normal condition	First 5,000KM and later every 5,000KM or every three months																	
	Extreme condition	Same mileage																	
Air filter element			I	I	I	R	I	I	I	R	I	I	I	R	I	I	I	R	
Check engine idling				I		I		I		I		I		I		I		I	
Check crankshaft ventilation hose				I		I		I		I		I		I		I		I	

Regular Inspection & Service Checklist of ISF2.8 Diesel Engine Parts

Distance and interval (in month) are indicated for each item, whichever is earlier.

I. Check, adjustment or replacement; R: Replacement, removal or lubrication; L: Lubricant; blank: N/A.

Item	Service Interval (The Earlier of Mileage Reading or Months)																	
	Months	—	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
	Mileage Reading * 1,000 KM	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Interior Check of Engine Chamber																		
Check for crack, fragment or wear in belt and adjust its tension			I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Check for radiator and A/C hose damage and connection				I		I		I		I		I		I		I		I
Check engien coolant level				I		I		I		I		I		I		I		I
Engien coolant										R								R
Others																		
Replace oil	Normal condition	R First 10,000KM and later every 20,000KM or every 12 months																
	Extreme condition	R First 10,000KM and later every 10,000KM or every 6 months																
Replacement oil filter	Normal condition	R First 10,000KM and later every 20,000KM or every 12 months																
	Extreme condition	R First 10,000KM and later every 10,000KM or every 6 months																
Replacement diesel filter	Normal condition	R First 10,000KM and later every 20,000KM or every 12 months																
	Extreme condition	R First 10,000KM and later every 10,000KM or every 6 months																
Replace air filter element	Normal condition	R First 10,000KM and later every 20,000KM or every 12 months																
	Extreme condition	R First 10,000KM and later every 10,000KM or every 6 months																
Check engine idling				I		I		I		I		I		I		I		I
Timing belt				R		R		R		R		R		R		R		R

Regular Check & Service Checklist of Chassis & Electric Parts

Distance and interval (in month) are indicated for each item, whichever is earlier.

I. Check, adjustment or replacement; R: Replacement, removal or lubrication; L: Lubricant; blank: N/A.

Item	Service Interval (The Earlier of Mileage Reading or Months)																	
	Months	—	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48

Mileage Reading * 1,000 KM	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Chassis Parts																	
Brake pedal, clutch pedal & hand brake			I		I		I		I		I		I		I		I
Brake lining & brake drum			I		I		I		I		I		I		I		I
Brake tube & brake hose			I		I		I		I		I		I		I		I
Brake fluid (including clutch oil)		I	I	I	I	I	I	I	R	I	I	I	I	I	I	I	R
Power steering oil		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Manual transmission oil			I		I		I		R		I		I		I		R
Transfer case oil			I				I				I				I		
Main reducer & differential oil			I		I				R				I				R
Steering wheel, steering rod & steering gear			I		I		I		I		I		I		I		I
Ball joint & dust shield		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Front & rear suspension systems					I				I				I				I
Front wheel alignment					I				I				I				I
Tire & pressure			I		I		I		I		I		I		I		I
Transmission shaft connecting parts			I		I		I		I		I		I		I		I
Transmission shaft sliding fork			R		R		R		R		R		R		R		R
Cnstant driving half axle dust shield			I		I		I		I		I		I		I		I
Wheel bearing & ball pin grease			I		R		I		R		I		R		I		R
Emission pipe & muffler			I		I		I		I		I		I		I		I
Electric System																	
Lighting & horn		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
A/C system & refrigerant			I		I		I		I		I		I		I		I
SRS air bag	Initial inspection 12 months after licensing and later every 24 months																
Battery		I		I		I		I		I		I		I		I	
Wheel Nut	Tighten it to rated torque, check every 5,000 or 10,000KM																

SERVICE SCHEDULE AT EXTREME CONDITIONS

According to the driving conditions listed below, implement services to the items with extra service frequency (refer to Regular Service Schedule for unlisted items).

A-1: Uneven, muddy or snow melting road	
☐ Check brake lining and brake drum	Every 5,000KM or 3 months
☐ Check brake pad and brake disc	Every 5,000KM or 3 months
☐ Check brake pipe and hose	First 5,000KM and later every 5,000KM or every three months
☐ Check steering wheel, steering rod and gearbox oil	Every 5,000KM or 3 months
☐ Replace wheel bearing grease	Every 5,000KM or 3 months
☐ Grease transmission shaft (apply grease within 24 hours after immersed in water, regardless of service interval; check and tighten bolts)）	Every 10,000KM or 6 months
☐ Check transmission shaft and constant driving half axle rubber pad	Every 10,000KM or 6 months
☐ Check front & rear suspension systems	Every 10,000KM or 6 months
☐ Tighten bolts and nuts connecting chassis and body	Every 10,000KM or 6 months
A-2: Dusty road	
☐ Check air filter element	Every 5,000KM or 3 months
☐ Replacement engine oil and oil filter	First 5,000KM and later every 5,000KM or every three months
☐ Check brake lining and brake drum	Every 5,000KM or 3 months
☐ Check brake pad and brake disc	Every 5,000KM or 3 months
☐ Grease transmission shaft (apply grease within 24 hours after immersed in water, regardless of service interval; check and tighten bolts)）	Every 5,000KM or 3 months
☐ Check transmission shaft and constant driving half axle rubber pad	Every 5,000KM or 3 months
A-3: Salina road	
☐ Grease transmission shaft (apply grease within 24 hours after immersed in water, regardless of service interval; check and tighten bolts)）	Every 5,000KM or 3 months
☐ Check transmission shaft and constant driving half axle rubber pad	Every 5,000KM or 3 months
B-1: Towing another vehicle or using camping rack or roof rack	
☐ Replacement engine oil and oil filter	First 5,000KM and later every 5,000KM or every three months
☐ Check brake lining and brake drum	Every 5,000KM or 6 months
☐ Check brake pad and brake disc	Every 5,000KM or 3 months
☐ Replace differential gear oil	Every 20,000KM or 12 months

☐ Check or replace manual transmission oil	Check every 5,000KM and replace every 20,000KM
☐ Grease transmission shaft (apply grease within 24 hours after immersed in water, regardless of service interval; check and tighten bolts)）	Every 5,000KM or 3 months
☐ Check front & rear suspension systems	Every 10,000KM or 6 months
☐ Tighten bolts and nuts connecting chassis and body	Every 10,000KM or 6 months
B-2: Short distance no more than 8KM repeatedly at 0℃ or below	
☐ Replacement engine oil and oil filter	First 5,000KM and later every 5,000KM or every three months
B-3: Long distance at idling or low speed, such as petrol car, taxi or door-to-door delivery truck	
☐ Check brake lining and brake drum	Every 5,000KM or 3 months
☐ Check brake pad and brake disc	Every 5,000KM or 3 months
☐ Replacement engine oil and oil filter	First 5,000KM and later every 5,000KM or every three months
B-4: More than 2 hours at extremely high speed (80% of the maximum speed)	
☐ Replace differential gear oil	Every 20,000KM or 12 months
☐ Check or replace manual transmission oil	Check every 5,000KM and replace every 20,000KM

CHECK

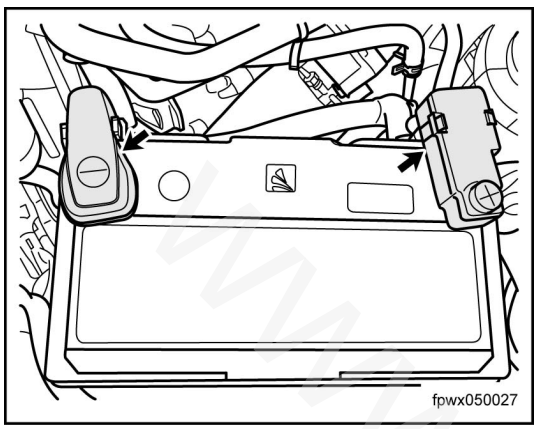
CHECK ELECTRICAL SYSTEM

- **Check the performance and operation of front combined lamp, fog lamp, turning signal, alarming flash, rear combined lamp, rear fog lamp, reverse lamp and park lamp.**
- **Check the operation of interior lighting.**
- **Check the operation of buzz indicator, control unit, central channel, all switches on the dashboard and horn.**
- **Check the operation of electric windows, side mirrors and central lock.**
- **Check the reception and interference resistance of the radio and speakers.**

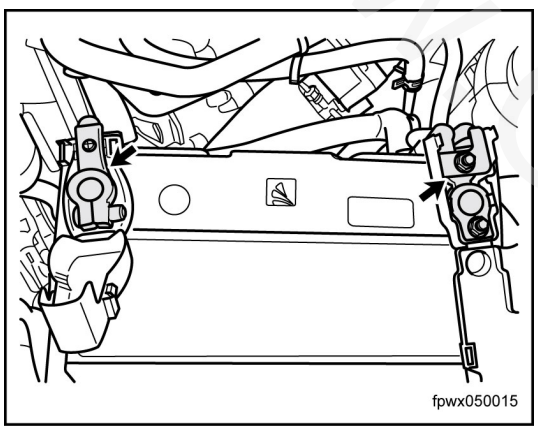
CHECK BATTERY

⚠ **CAUTION**

- **Keeping the battery cable clean and secured will help to ensure its performance and service life.**
- **When securing the batter cable, make sure it is at the right position, or it will affect the use of the consumers and the service life of the battery.**



1 . Open the battery cable cover.

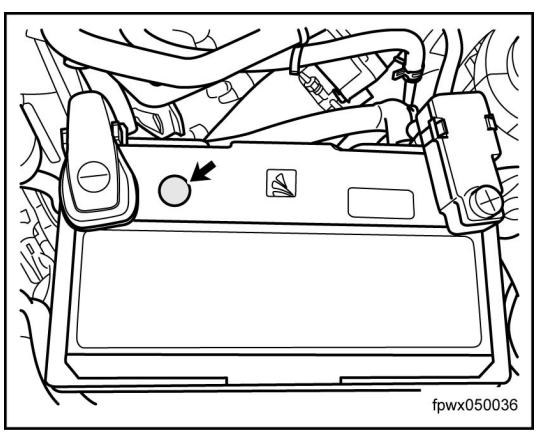


2 . Check the battery:

(a) Check if there is any corrosion or breakage on the battery housing and cable, and replace them if needed.

(b) Swing the batter cable and ensure it is secured.

(c) If the positive battery cable is not secured, disconnect the negative cable, fix the positive cable and then reinstall and secure the negative cable nut.



3 . Check the color of the battery power indicator.

(a) Blue means it is in good condition.

(b) White means the power is low and needs recharging.

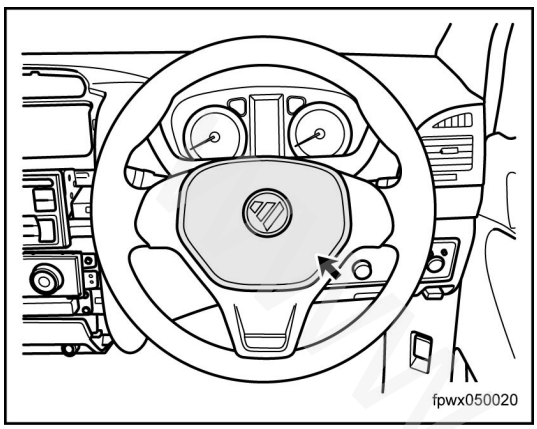
(c) Red means the electrolyte is inadequate and the battery needs replacement.

CHECK AIR BAG

⚠ CAUTION

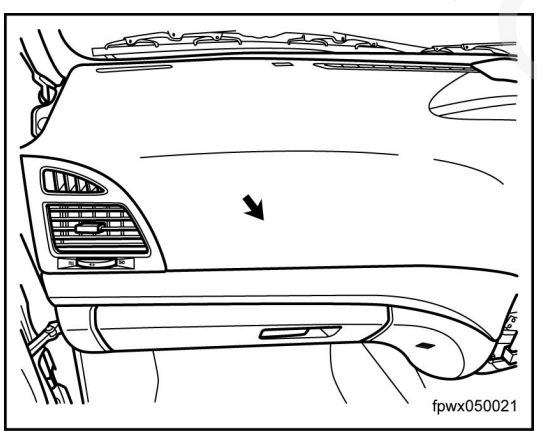
- **It is important to inform the user that no adhesive or attachment is allowed on the cover of the air bag, in order to prevent any damage or barrier to the air bag and ensure its normal functioning.**
- **The cover of the air bag can only be cleaned with dry or slightly wet cloth.**

Check Driver's Air Bag



1 . The driver's air bag is located in the center of the steering wheel. Visually inspect the completeness of the plastic cover.

Check Front Passenger's Air Bag



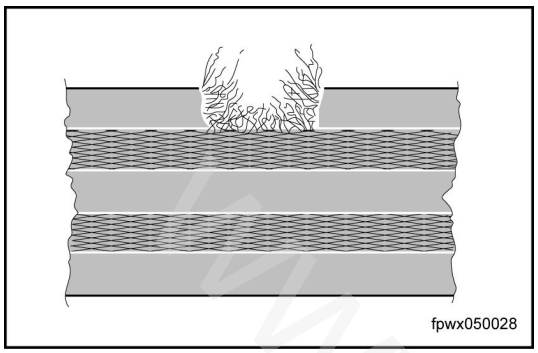
1 . The front passenger's air bag is located above the glove compartment. Visually inspect the completeness of the plastic cover.

CHECK SEAT BELT

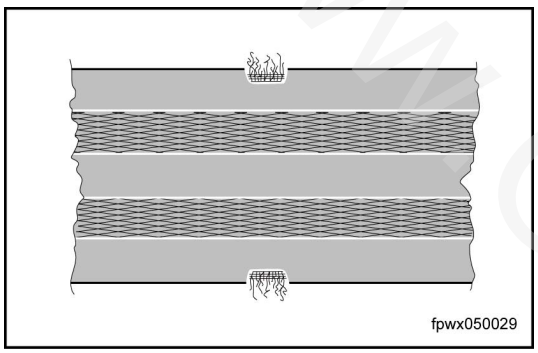
⚠ **CAUTION**

- **During inspection, completely pull the seat belt from the automatic winder.**
- **Check the cleanness of the seat belt and wash it in mild soap solution if needed.**

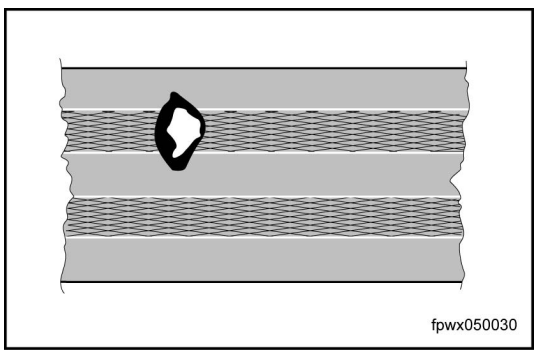
1 . Check for the following damages in the seat belt and replace it if necessary:



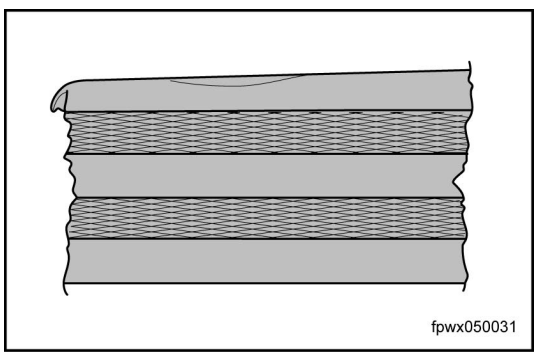
(a) Broken, torn or scratched



(b) Torn fabric at the edge.

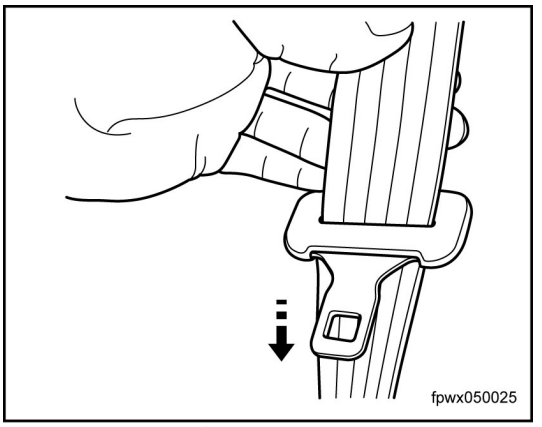


(c) Cigerrette or other burnt mark.



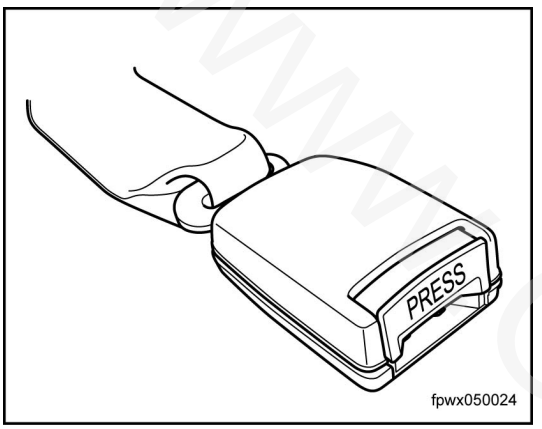
(d) Distortion in one side or wave-like edge.

2 . Check seat belt lock

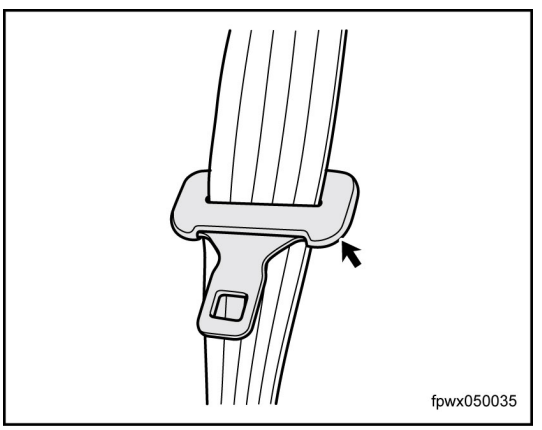


(a) Quickly and forcefully pull down the seat belt, check its locking performance and replace it if needed.

3 . Check guide buckle & lock tongue



(a) Check for distortion, disconnection and crack on the cover of guide buckle and replace it if needed.

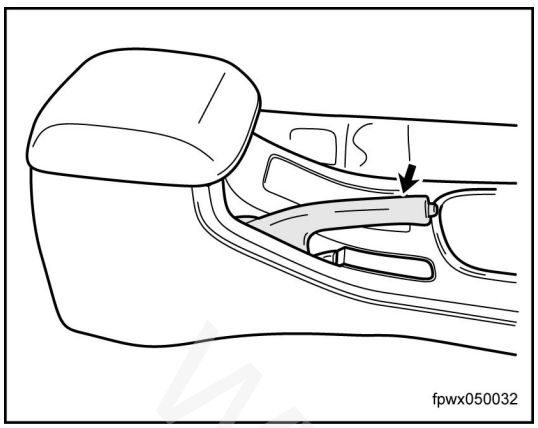


(b) Check for distortion and crack on the lock tongue and replace it if needed.

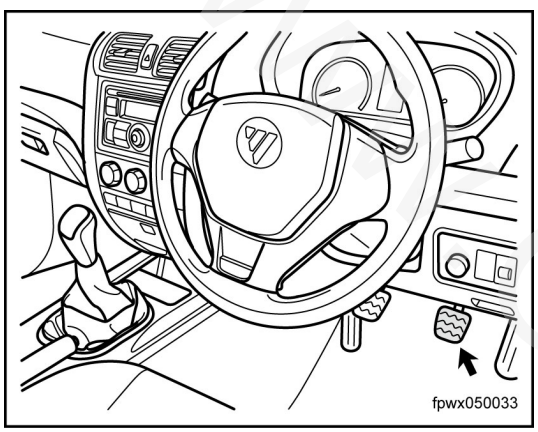
(c) Insert the lock tongue into the guide buckle and check whether it is firmly secured. Make 5 or more tests and replace if if any of the tests fails.

CHECK PARK BRAKE & BRAKE PEDAL

1 . Check Park Brake & Brake Pedal



2 . Check whether the park brake works smoothly, whehter the pulling strength required by the handle is correct and whether the cable is damaged. Overhaul it if needed.



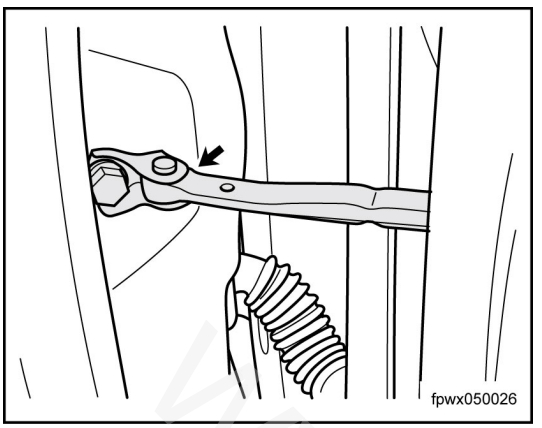
3 . Check whether the brake pedal is loose and whehter the free travel is correct. Overhaul it if needed.

Free travel: 10mm

4 . Take a trial drive and check the functioning of the park brake and brake pedal. Overhaul it again if needed.

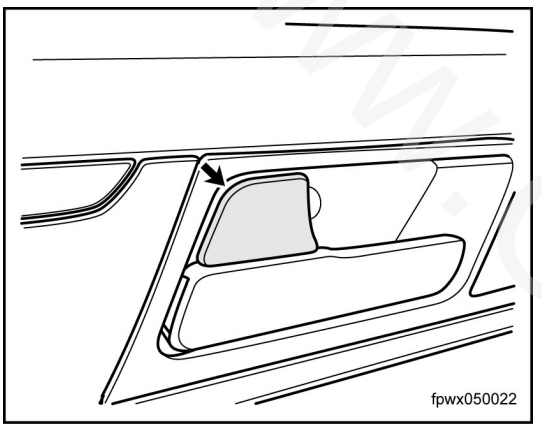
CHECK DOOR STOPPER, LOCK & HINGE

1 . Check door stopper



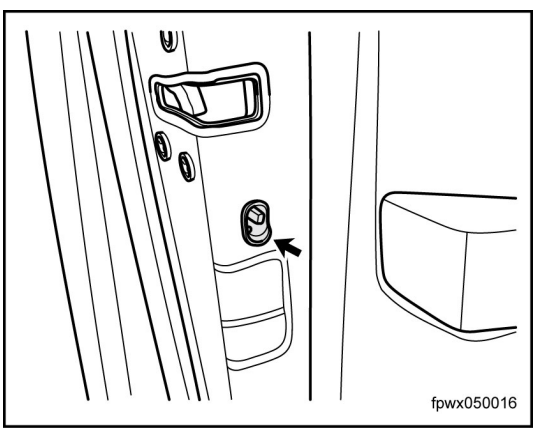
(a) Check the functioning of the door stopper and apply grease to the joint if less smooth.

2 . Check door lock, safety button and child safety lock



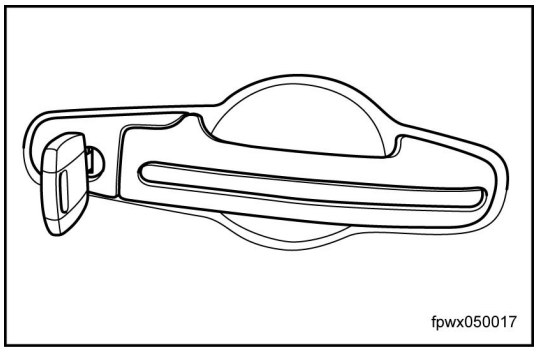
(a) Lock up the door and check the functioning of the safety button.

(b) Press down the safety button and close the door. The safety button will bounce up to prevent door from being locked by accident.



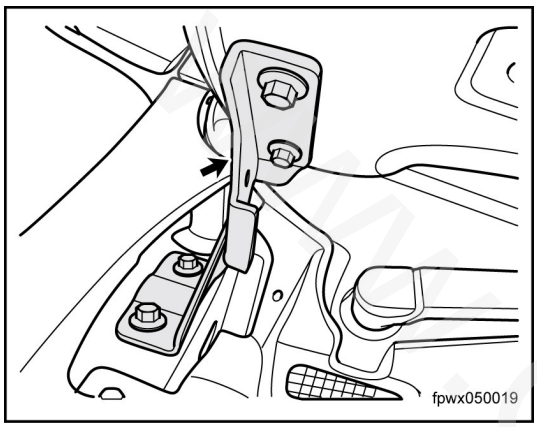
(c) Switch the child safety lock from OFF to ON, when the door can only be opened from outside.

3 . Check lock element

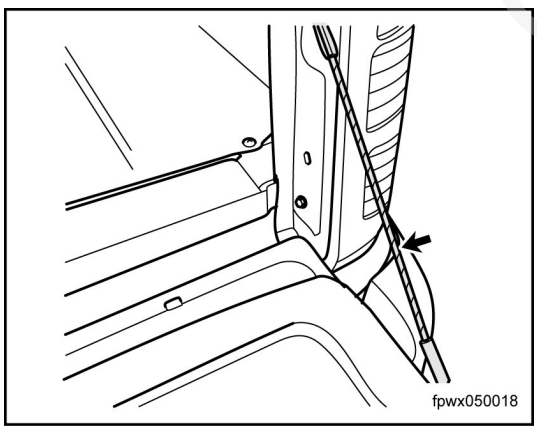


(a) Insert the key into the door lock.
(b) The lock element must rotate smoothly when turning the key clockwise and counterclockwise.

4 . Check engine hood cover and rear plate assembly hinge



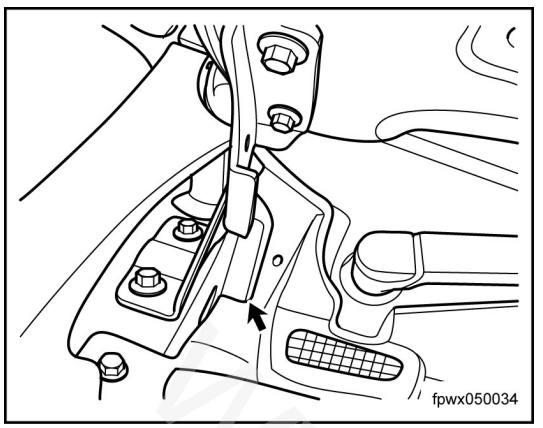
(a) Repeatedly open and close the engine hood cover, check whether the hinge moves smoothly and apply grease if needed.



(b) Repeatedly open and close the rear plate assembly hinge, check whether the hinge moves smoothly and apply grease if needed.

CHECK WINDSCREEN DRAIN HOLE

1 . Open the engine hood.



2 . Check whether there is any impurity and blockage in the drain whole and clean it if needed.

3 . Restore the engine hood.

CHECK ENGINE COMPARTMENT COMPONENTS

⚠ **CAUTION**

- **Fix any fault in a timely manner.**
- **Refill the fluid loss and fix leakage promptly.**

1 . Open the engine hood.

2 . Check for leakage, damage and aging sign in the following pipes, hoses and joints. Ensure the proper clearance between the piping and the body and adjust or replace it if needed.

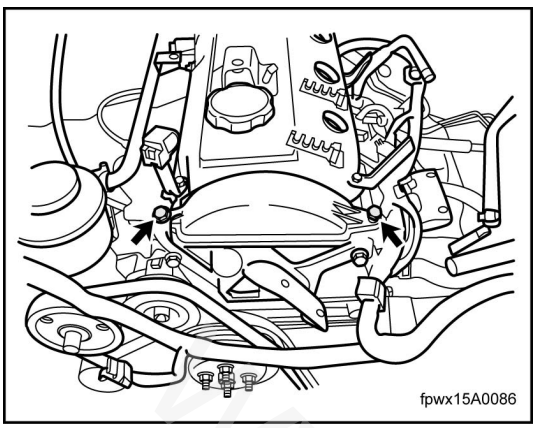
(a) Fuel system

(b) Piping of air-conditioning and cooling systems

(c) Braking unit and piping

CHECK TOOTHED TIMING BELT

1 . Switch off the ignition.

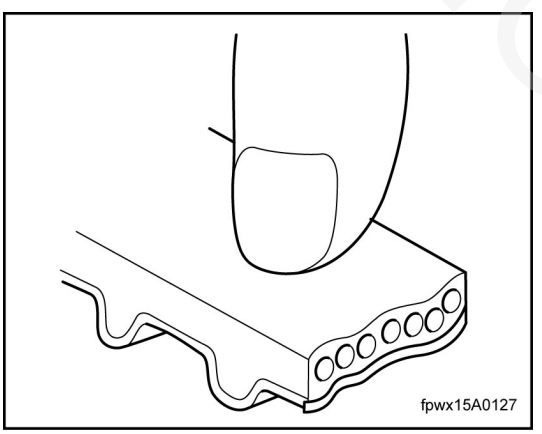


2 . Remove the retaining bolts on the front upper cover of the toothed timing belt and then the cover.

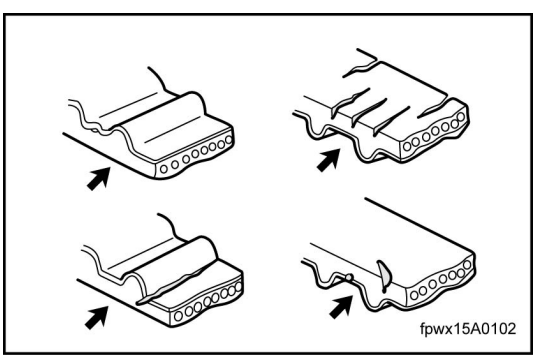
3 . Check for any of the following conditions and replace it if needed:

⚠ CAUTION

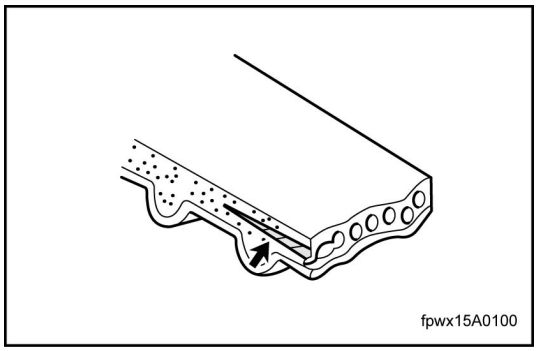
- **Water or grease on the toothed belt will quickly reduce its service life. If there is serious oil mark on the belt, replace it with a new one instead of washing.**
- **If there is oil mark on the toothed belt, check for oil and fluid leakage in the engine.**



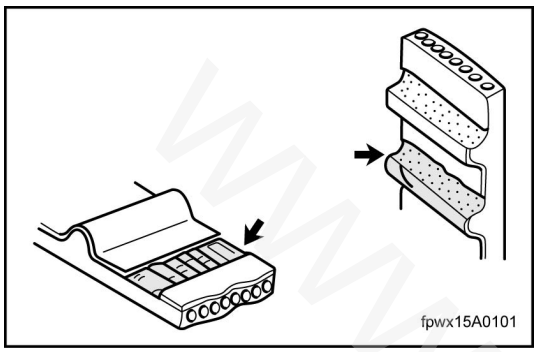
(a) Aged and shiny rubber on the back, showing no nail scratch.



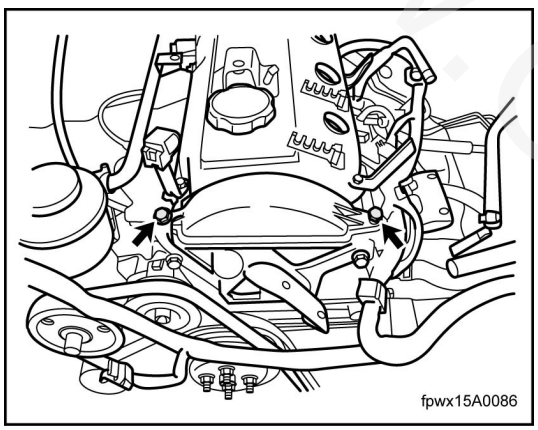
(b) Cracked or peeled canvas.
(c) Cracked rubber on the back.
(d) Cracked belt tooth at the bottom.
(e) Cracked belt tooth on the side.



(f) Unusual tear wear on the side of the belt.



(g) Unusual tear wear of the belt.
(h) Missing tooth.



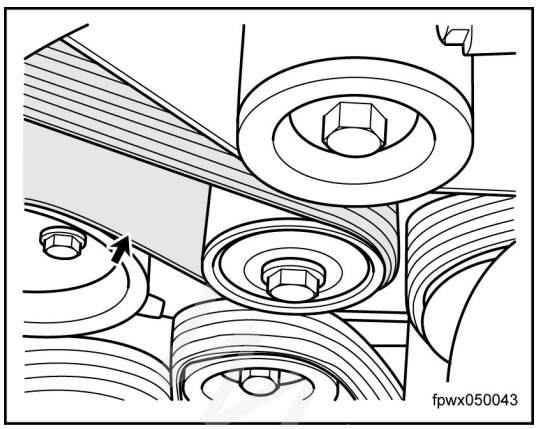
4 . Install the front upper cover of the timing belt and tighten the retaining bolts.

Torque: 18～26N•m

CHECK ACCESSORY BELT

1 . Switch off the ignition.

2 . Open the engine hood.



3 . Check for breakage and aging sign on the accessory belt and replace it if needed.

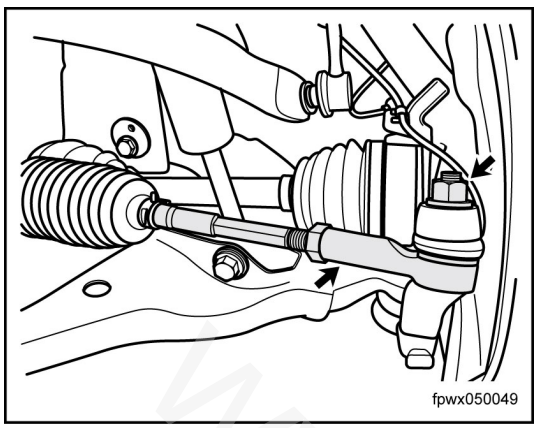
⚠ **CAUTION**

- Water or grease on the belt will quickly reduce its service life. If there is serious oil mark on the belt, replace it with a new one instead of washing.
- If there is oil mark on the belt, check for oil and fluid leakage in the engine.

4 . Restore the engine hood.

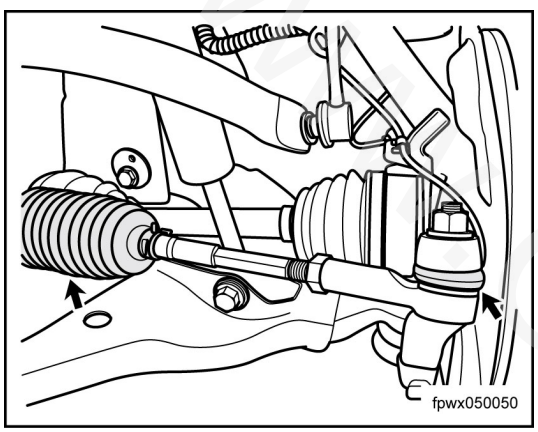
CHECK STEERING BALL JOINT & DUST SHIELD

1 . Lift up the vehicle.



2 . Swing the tie rod and make sure there is no gap.

3 . Check whether the retaining nut on the ball joint is secured.



4 . Check for damage in dust shield and ball rubber, and replace them if needed.

CHECK & TIGHTEN CHASSIS BOLTS AT SPECIFIED TORQUE

⚠ CAUTION

- **When looking up at the chassis, be careful of dust, sand and soil, which may fall into your eyes.**
- **Wear safety hamlet, gloves and other protective equipments when tightening the chassis bolts.**

1 . Switch off all electrical units and ignition.
2 . Lift up the vehicle.
3 . Check all retaining bolts on the chassis and the tightness and rust of the nuts.
4 . Retighten all retaining bolts and nuts at specified torque.

CHECK HEADLIGHT

1 . Prepare for checking the headlight:

(a) Place the vehicle on a level ground.

(b) A driver is in the vehicle (or replaced by a weight of 73 KG), and the fuel tank is more than half full.

(c) The tire pressure is normal.

(d) The interior structure of the headlight is normal.

2 . Check the headlight:

(a) Check for damage in the headlight assembly and replace if needed.

(b) Test the headlight functions and replace any burnt bulb. Make sure whether the adjustment function is normal.

(c) Check for steam or other impurity inside the headlight.

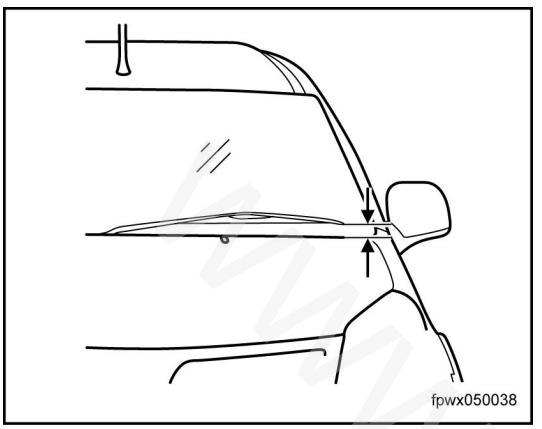
(d) If any deviation in the range of the headlight, make proper adjustment. (Refer to "Chapter 64. Lighting - front combination lamp assembly LH, adjustment")

CHECK WIPER/WASHER

1 . Check the limit position of the windscreen wiper:

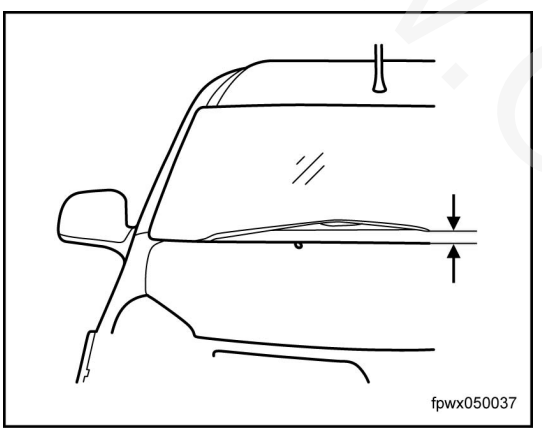
⚠ CAUTION

- **When checking, the wiper blade shall be static. Adjust it if needed.**
- **Wiper arm torque: 18～21N·m.**



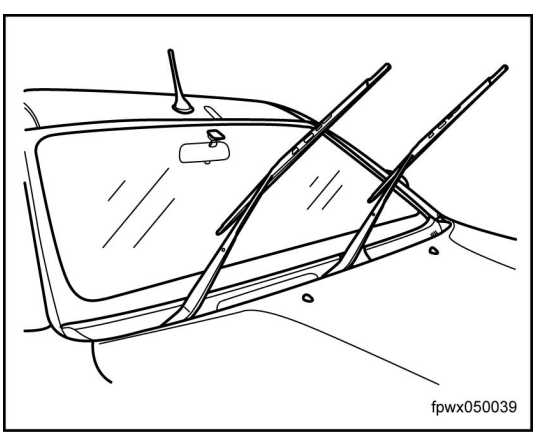
(a) Driver side

- The distance between the wiper blade and the lower edge of the windscreen is 30mm.
- If necessary, move the wiper arm for adjustment.



(b) Front passenger side

- The distance between the wiper blade and the lower edge of the windscreen is 45mm.
- If necessary, move the wiper arm for adjustment.

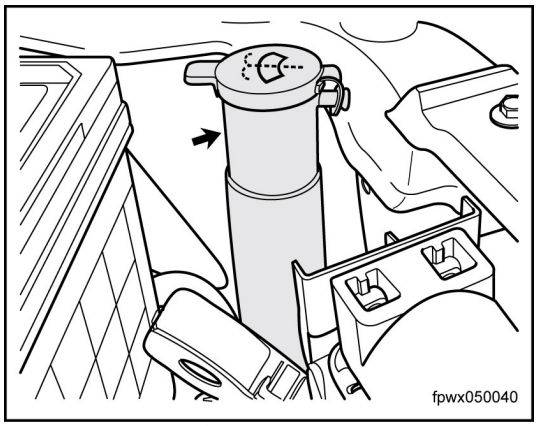


(a) Move the wiper arm to the service position, press the locking button of the wiper blade and remove the blade downward.

(b) Install the blade and switch the locking button to the locking position.

(c) Switch on the ignition and briefly operate the wiper arm, so that the windscreen wiper are repositioned at the end position.

3 . Check windscreen cleaner:

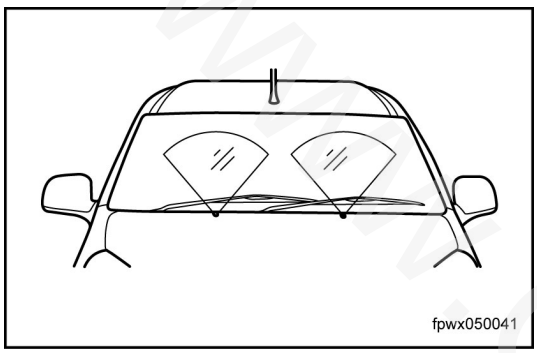


(a) The level of the windscreen cleaner shall be 10cm below the opening. Top it up if below that level.

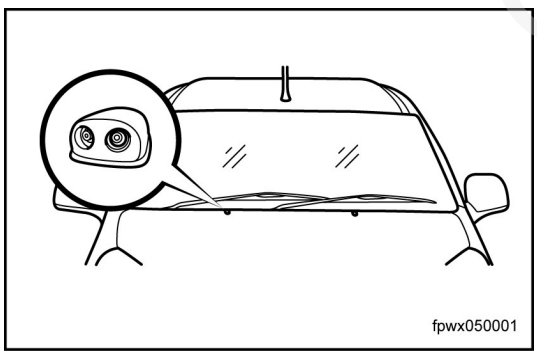
⚠ CAUTION

Please check the windscreen cleaner on a regular basis, for it is a consumable.

4 . Check the windscreen spray:



(a) The normal spray coverage is as illustrated.



(b) If any deviation, adjust the nozzle.

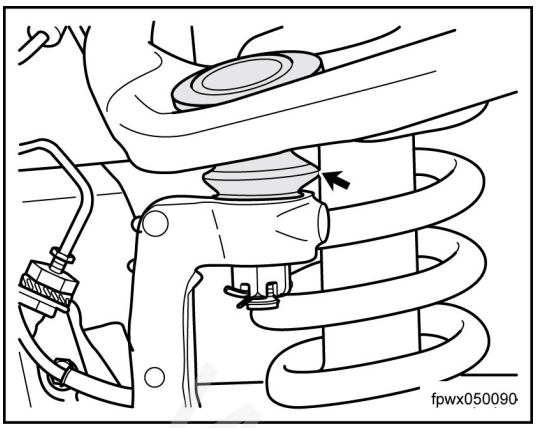
CHECK VEHICLE BOTTOM

1 . Lift up the vehicle.
2 . Check for leakage in the fuel and brake fluid pipes.
3 . Inspect the bottom protection and check for damage on the wheel cover and fringe beam.
4 . Visually check for any aging sign in the installation lug of the exhaust pipe and whether it is secured.

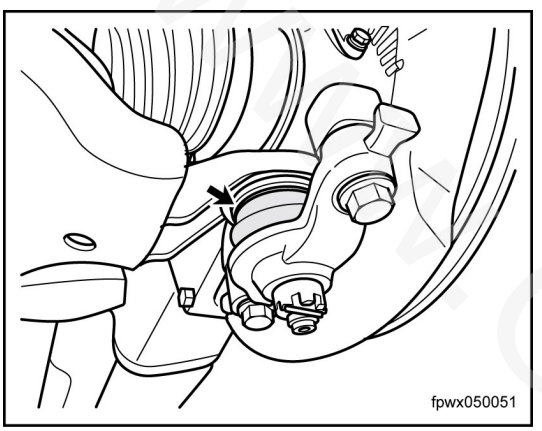
CHECK SUSPENSION COMPONENTS

1 . Lift up the vehicle.
2 . Check for aging sign and breakage in all connection bush.
3 . Tighten all connection bolts and nuts at specified torque.
4 . Check for distortion and crack at all connections.
5 . Check for leakage in the shock absorber and damage in the dust shield.

CHECK SUSPENSION BALL JOINT & DUST SHIELD



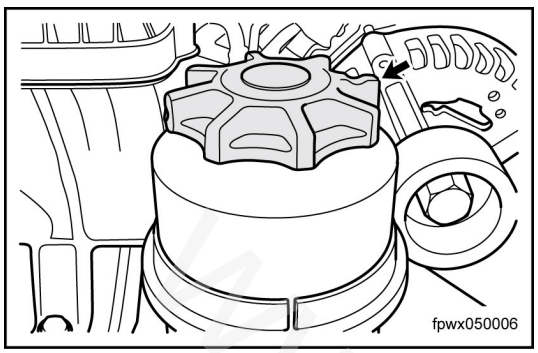
1 . **Check for damage in the dust shield of the upper arm ball and replace it if needed.**



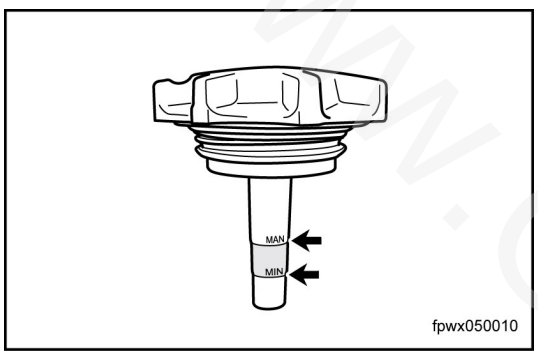
2 . **Check for damage in the dust shield of the bottom arm ball and replace it if needed.**

CHECK POWER STEERING TANK LEVEL

1 . Place the vehicle on a level ground.
2 . Switch off the ignition.
3 . Turn the front wheels straight forward.
4 . Open the engine hood.

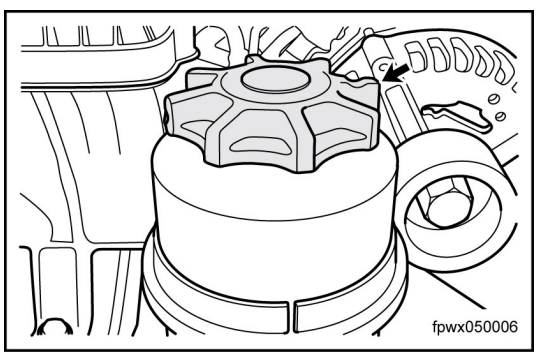


5 . Screw out the filler cap of the power steering tank.



6 . Check the level, which should be between the maximum level and the minimum level. If not, drain it or top it up.

Steering fluid model : ATF-III



7 . Tighten the filler cap of the power steering tank.

8 . Restore the engine hood.

CHECK BRAKING SYSTEM

⚠ **CAUTION**

- **Only use the braking fluid authorized by Foton.**
- **Do not mix the braking fluid with other liquid, or it may damage the braking system and affect the driving.**
- **Determine whether topping is necessary depending on the tear and wear of the brake lining.**

1 . Open the engine hood.

2 . Check braking fluid tank level:

(a) When the brake lining is extremely worn, the level should be close to the minimum level.

(b) When the brake lining is hardly worn, the level should be close to the maximum level.

3 . Check for damage and leakage in the following parts:

(a) Brake pump

(b) Servo brake

(c) Brake calipers

(d) Brake pipe

4 . Check whether the gap between the brake hose and the body is correct, whether there is any scratch on the brake hose and whether the connection and fitting of the brake pipe are secured.

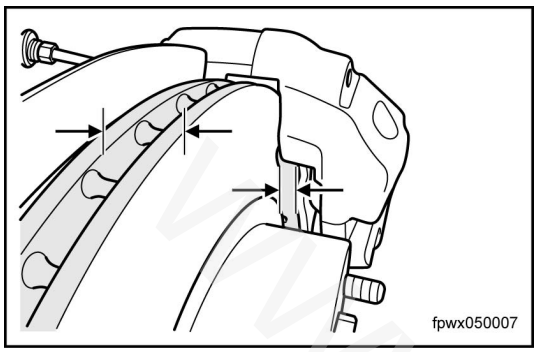
CHECK BRAKE DISC, BRAKE DRUM & LINING

⚠ CAUTION

If the brake disc, brake drum or brake lining is worn to its extreme, it is necessary to inform the customer and suggest replacement.

1 . Check front brake disc & brake lining

(a) Remove the front wheel. (Refer to "Chapter 33. Wheel & tire - front wheel & tire, replacement")



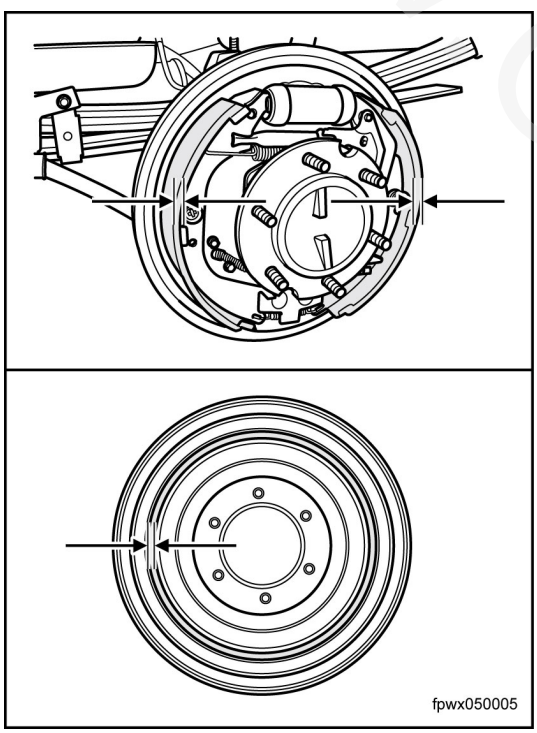
(b) Meausre the thickness of the brake lining (without back plate) and brake disc.

- Standard thickness of brake lining (without back plate): 12mm, extreme thickness: 2mm.
- Standard thickness of brake disc: 22mm, extreme thickness:21mm.

(c) Install the front wheel. (Refer to "Chapter 33. Wheel & tire - front wheel & tire, replacement")

2 . Check rear brake drum & brake lining

(a) Remove the rear wheel.



(b) Measure the thickness of the brake lining (without back plate) and brake drum.

- Standard thickness of brake lining (without back plate): 7.5mm, extreme thickness: 2.5mm.
- Standard thickness of brake drum: Φ295mm, extreme thickness: Φ296mm.

(c) Install the rear wheel. (Refer to "Chapter 33. Wheel & tire - rear wheel & tire, replacement")

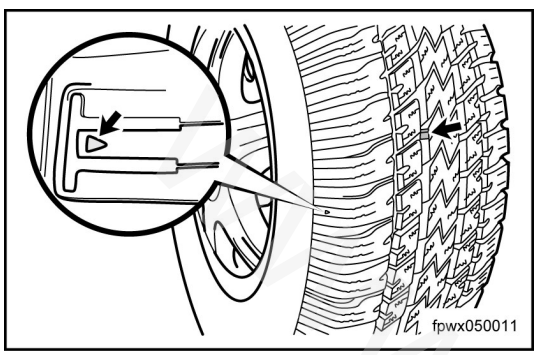
CHECK TIRE

⚠ **CAUTION**

When it is found that the tire is worn to its extreme or so damaged that it affects driving safety, it is necessary to inform the customer and suggest replacement.

1 . Check for damage and impurity on the rolling surface and side wall of the tire as well as hole, cut and piercing on the wall.

2 . Check whether the rolling surface is seriously worn in one side, and if yes, perform wheel alignment.



3 . Check the tread depthn (including spare tire) and ensure the depth is greater than that of the wear indicator and the side wear indicator hasn't been fully worn.

Max. tread depth: 1.6mm

4 . Check and adjust the tire pressure (including spare tire):

	Front tire	Rear tire	Spare tire
P245/70 R16	220kPa	240kPa	260kPa
P265/70 R16	220kPa	240kPa	260kPa
P265/65 R17	220kPa	240kPa	260kPa

CHECK EXHAUST SYSTEM

⚠ **CAUTION**

When working on the exhaust system, be careful of possible burn.

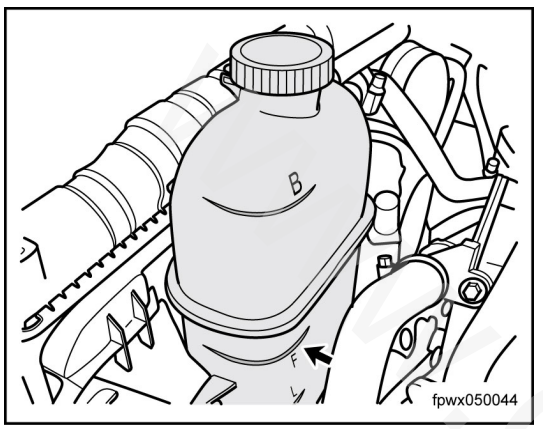
1 . **Lift up the vehicle.**
2 . **Check for damage in the front and rear exhaust pipes, silencer and catalyst converter housing.**
3 . **Check for leakage in the connections between the parts in the exhaust system.**
4 . **Check for aging sign or breakage in the hanging block**

CHECK COOLANT TANK LEVEL

⚠ CAUTION

- **When working on the cooling system, be careful of possible burns caused by hot water and steam.**
- **Only use the coolant authorized by Foton.**

1 . Switch off the ignition.
2 . Wait until the engine cools down.
3 . Open the engine hood.

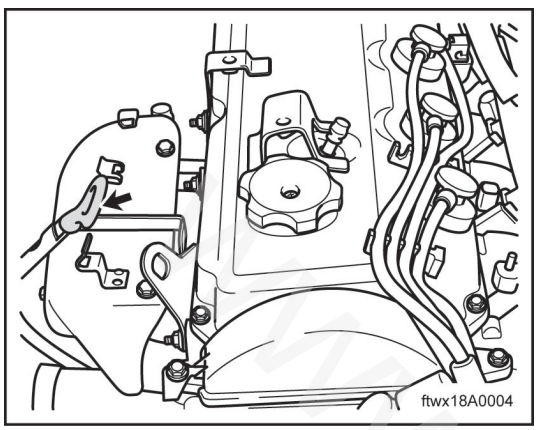


4 . Check the coolant level, which should be near Line (when the engine is cooled down).

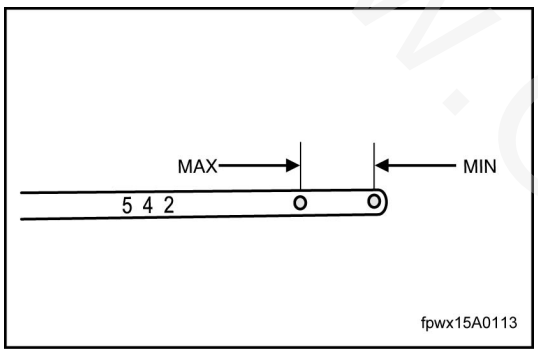
5 . Restore the engine hood.

CHECK ENGINE OIL LEVEL (4G69)

1 . Place the vehicle on a level ground.
2 . Heat up the engine to its normal working temperature.
3 . Switch off the ignition.
4 . Wait for around 3 minutes.
5 . Open the engine hood.

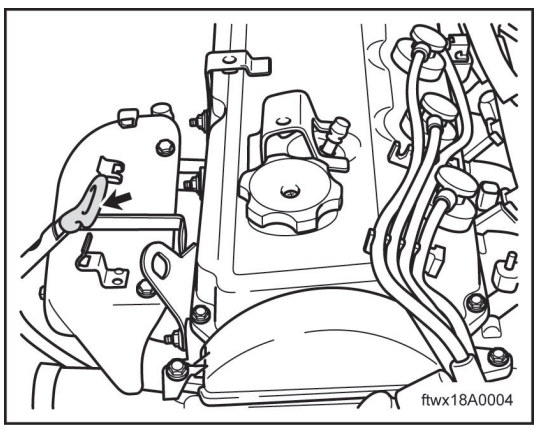


6 . Slowly pull out the oil gauge.



7 . Check the engine oil level, which should be within the range of the gauge scale.

8 . Check the quality of the engine oil. If it is too dirty or thin, fix the fault and then replace the oil.

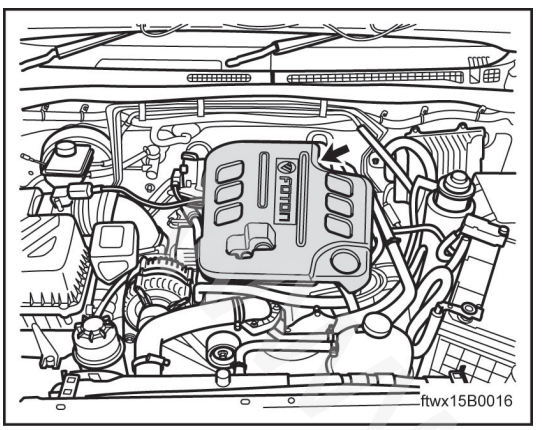


9 . Restore the oil gauge.

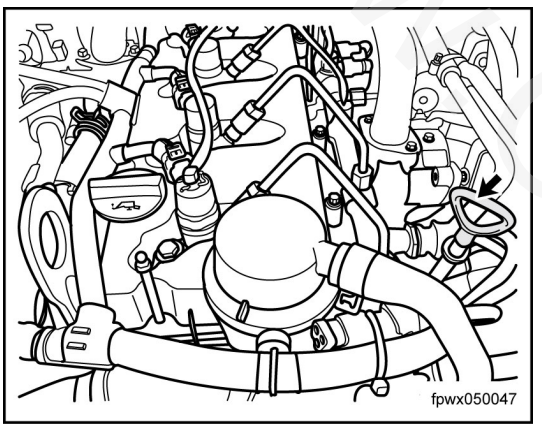
10 . Restore the engine hood.

CHECK ENGINE OIL LEVEL (ISF2.8)

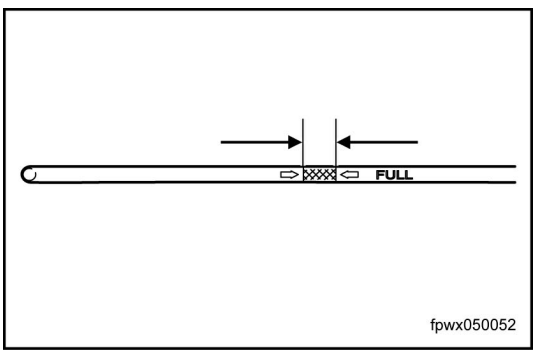
1 . Place the vehicle on a level ground.
2 . Heat up the engine to its normal working temperature.
3 . Switch off the ignition.
4 . Wait for around 3 minutes.
5 . Open the engine hood.



6 . Remove the upper engine hood.

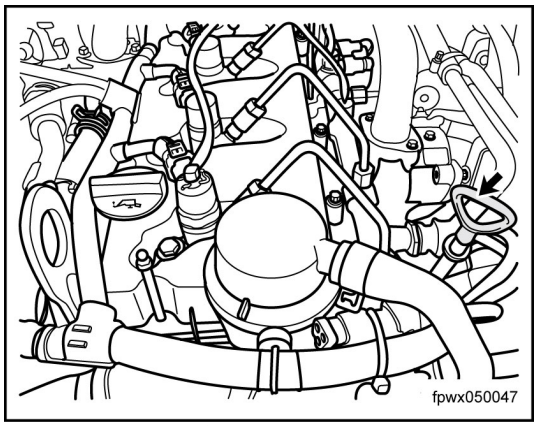


7 . Slowly pull out the oil gauge.

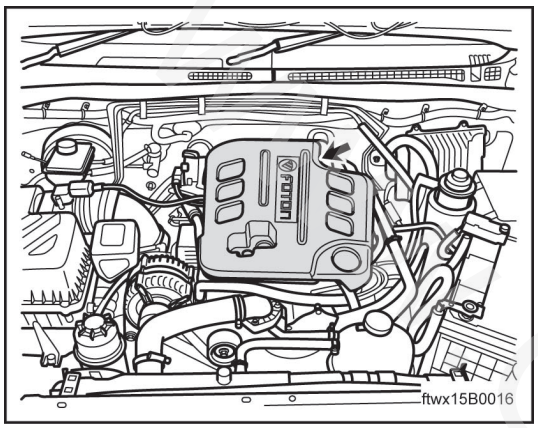


8 . Check the engine oil level, which should be within the range of the gauge scale.

9 . Check the quality of the engine oil. If it is too dirty or thin, fix the fault and then replace the oil.



10 . Restore the oil gauge.



11 . Install the upper engine hood.

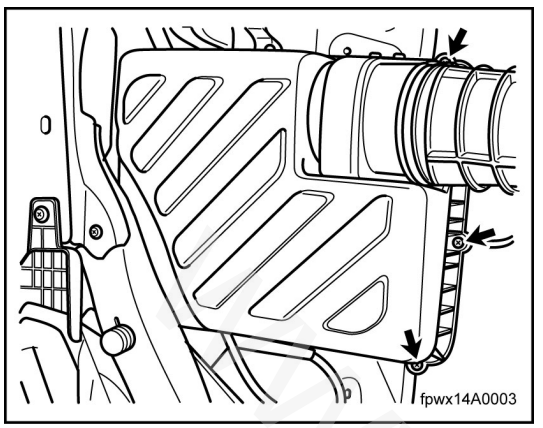
12 . Restore the engine hood.

REPLACEMENT

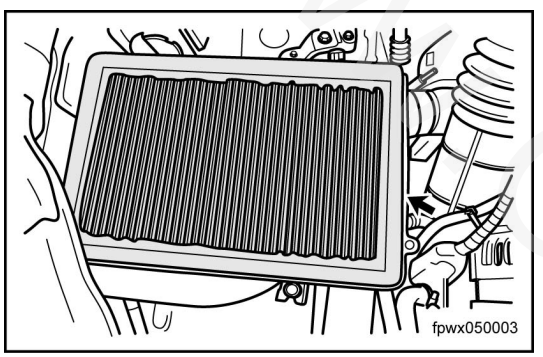
REPLACE AIR FILTER ELEMENT (4G69)

1 . Switch off the ignition.

2 . Open the engine hood.



3 . Unscrew the screw. Slightly lift up the outlet in the upper housing of the air filter, while pulling it towards the engine. Pull it out of the dowel pin hole in the lower housing, in order to separate the upper and lower housings.

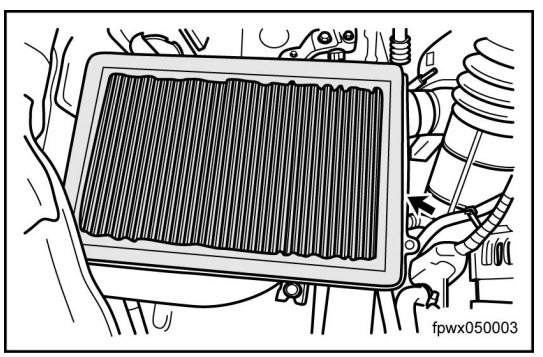


4 . Remove the air filter element.

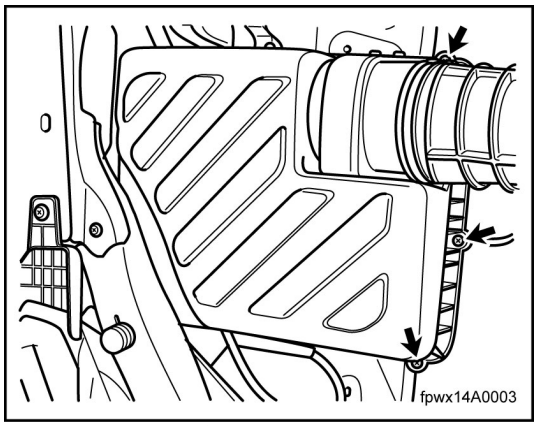
⚠ CAUTION

How to clean the element: Blow compressed air from the outlet of the element to the inlet, with the pressure of the compressed air below 0.07MPa. If any damage, replace it with a new and qualified element.

5 . Clean the impurities inside the air filter.



6 . Mount the air filter element.



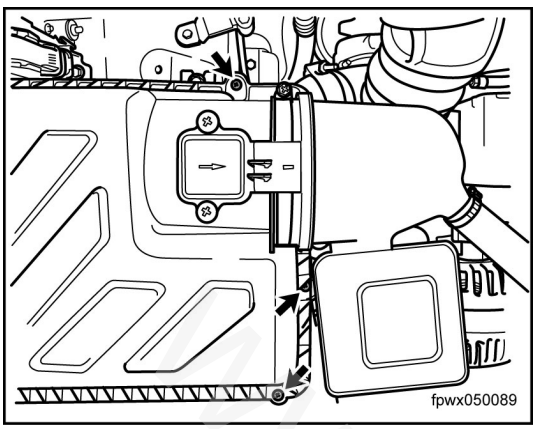
7 . Insert the dowel pin in the upper housing of the air filter to the hotel in the lower housing, in an inclined way. Press the outlet of the upper housing downward and align three screw holes in both housings. Install and tighten the retaining screws.

8 . Restore the engine hood.

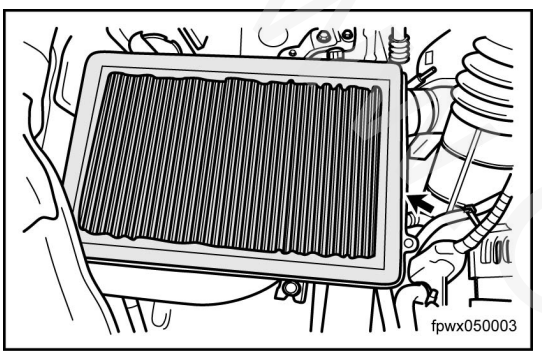
REPLACE AIR FILTER ELEMENT (ISF2.8)

1 . Switch off the ignition.

2 . Open the engine hood.



3 . Unscrew the screw. Slightly lift up the outlet in the upper housing of the air filter, while pulling it towards the engine. Pull it out of the dowel pin hole in the lower housing, in order to separate the upper and lower housings.

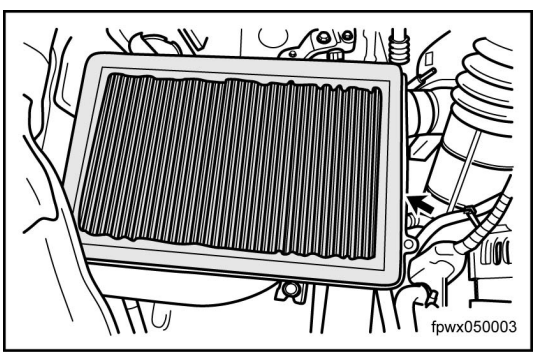


4 . Remove the air filter element.

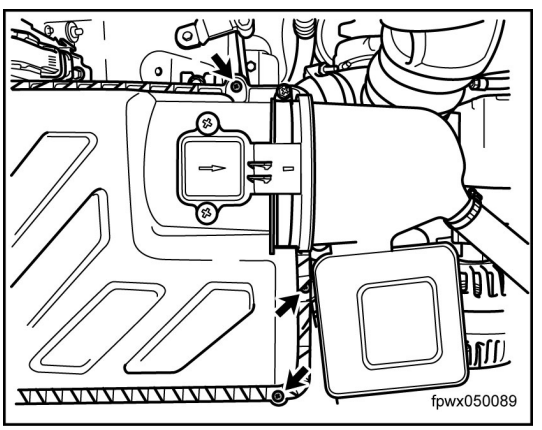
⚠ CAUTION

How to clean the element: Blow compressed air from the outlet of the element to the inlet, with the pressure of the compressed air below 0.07MPa. If any damage, replace it with a new and qualified element.

5 . Clean the impurities inside the air filter.



6 . Mount the air filter element.



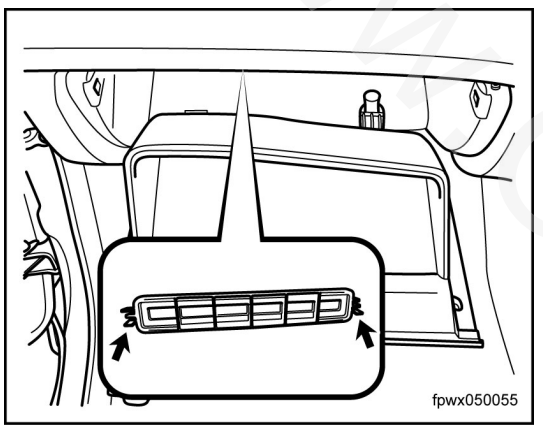
7 . Insert the dowel pin in the upper housing of the air filter to the hotel in the lower housing, in an inclined way. Press the outlet of the upper housing downward and align three screw holes in both housings. Install and tighten the retaining screws.

8 . Restore the engine hood.

REPLACE AIR-CONDITIONING FILTER ELEMENT

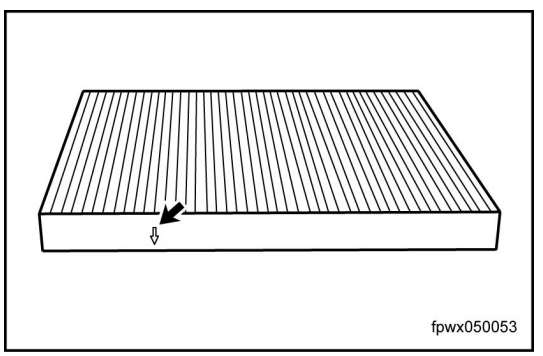
1 . Switch off all electrical units and ignition.

2 . Open the glove compartment.



3 . Press the clip and remove the cover used to replace the air-conditioning filter element.

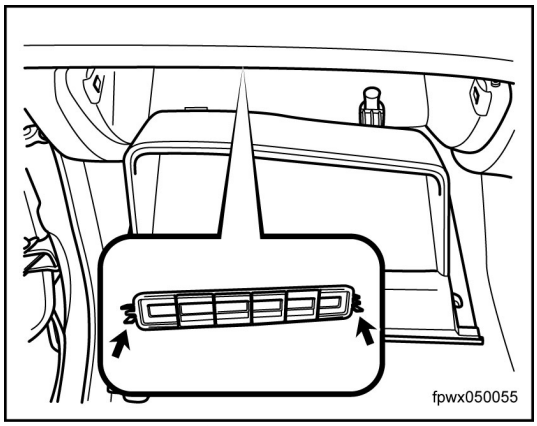
4 . Remove the filter element.



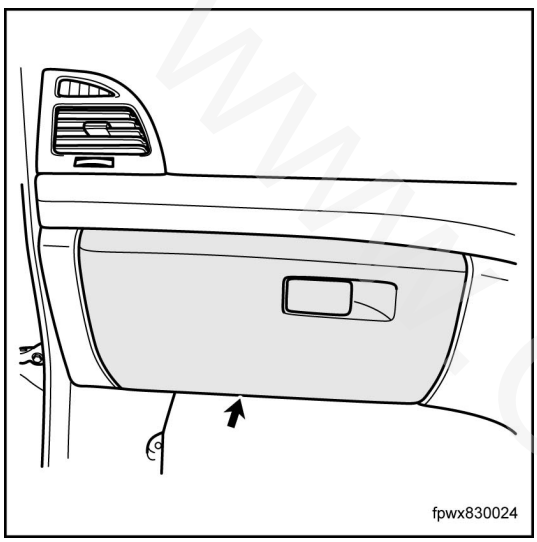
5 . Mount a new air-conditioning filter element.

⚠ CAUTION

During installation, make sure the arrow on the filter element pointing downward.



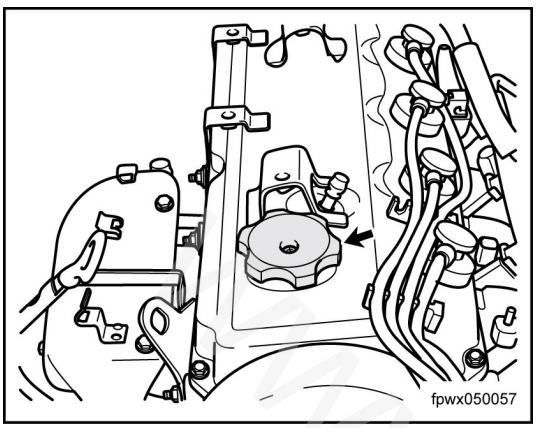
6 . Mount the cover used to replace the filter element and then the clip.



7 . Close the glove compartment.

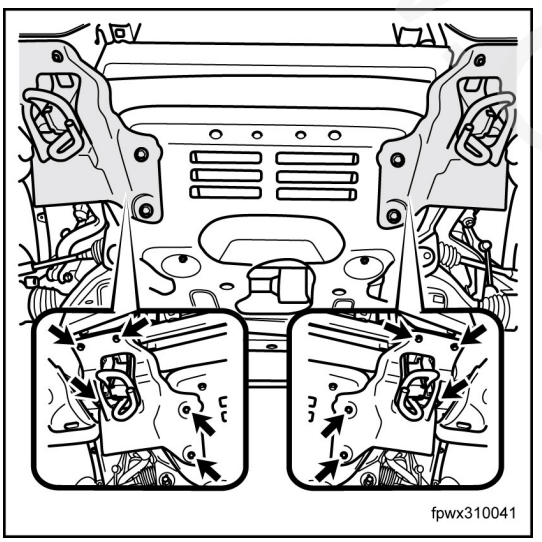
REPLACE ENGINE OIL & OIL FILTER (4G69)

1 . Place the vehicle on a level ground.
2 . Heat up the engine to its normal working temperature.
3 . Switch off the ignition.
4 . Wait for around 3 minutes.

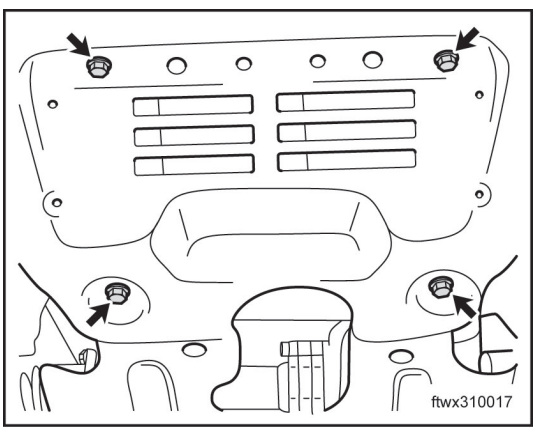


5 . Clean the engine oil filler cap with cloth and unscrew it.

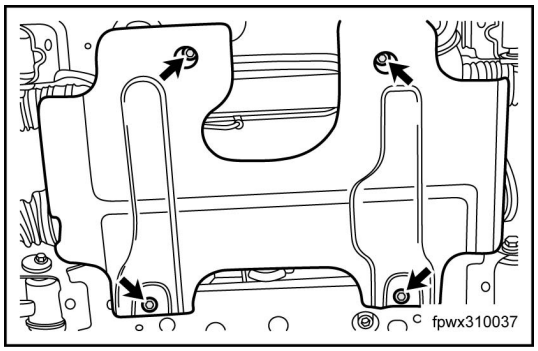
6 . Lift up the vehicle.
7 . Remove the lower engine baffle:



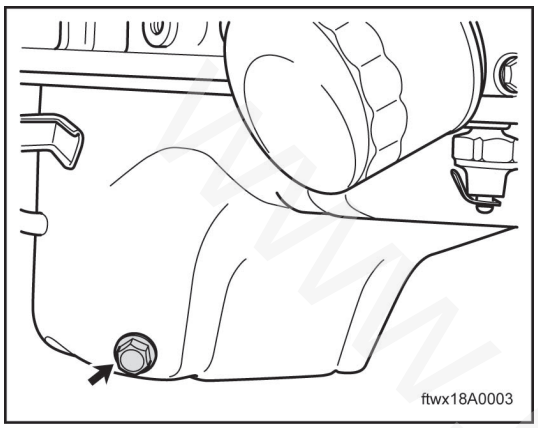
(a) Unscrew the retaining bolts of the small baffles on both sides and remove the baffles.



(b) Unscrew the retaining bolts of the front baffle and remove the baffle.



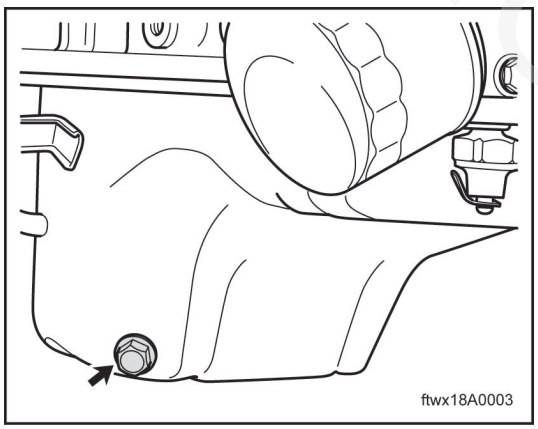
(c) Remove the retaining bolts of the rear baffle and then the baffle.



8 . Remove the oil drain plug and drain the engine oil.

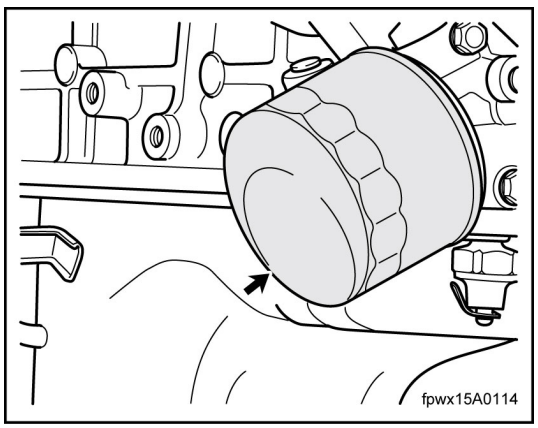
⚠ CAUTION

- **When draining, be careful of possible burns caused by hot engine oil.**
- **The drained engine oil shall be properly collected and treated as regulated.**

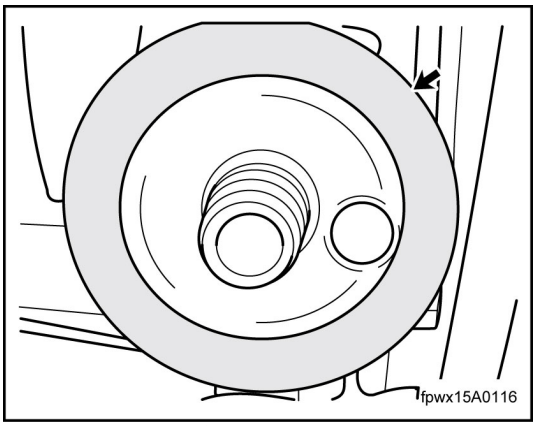


9 . Once completely drained, replace a new drain plug gasket, tighten the drain plug and clean the dirt.

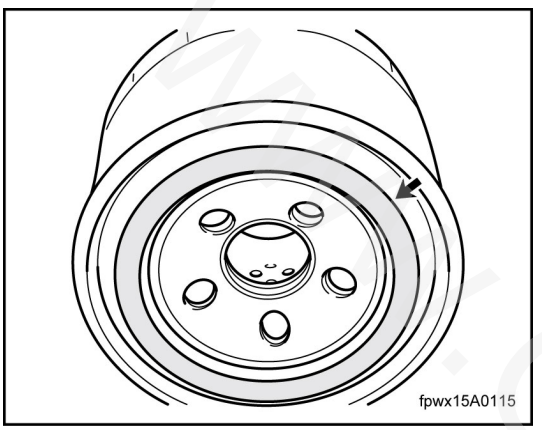
Torque: 45N.m



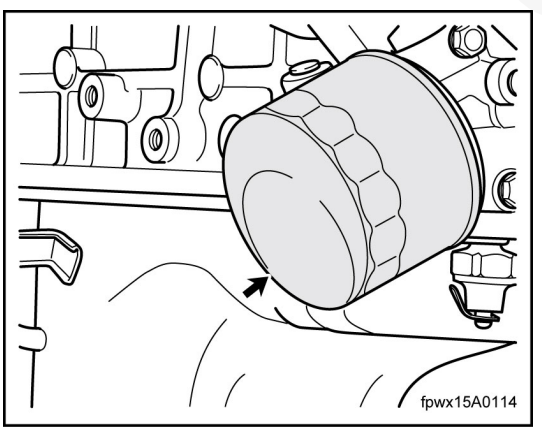
10 . Use the tools to remove the oil filter and replace a new one.



11 . Clean the interface between the oil filter holder and the filter.



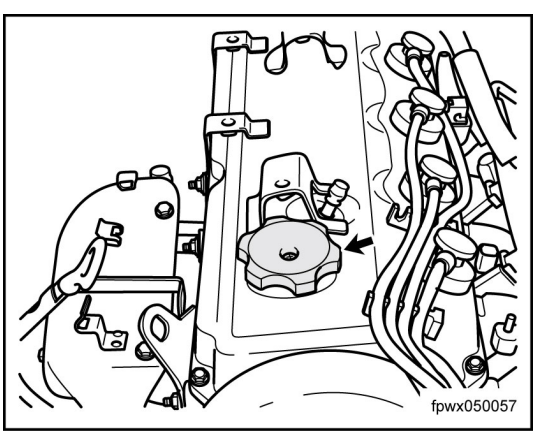
12 . Apply a small amount of engine oil on the O-ring of the new oil filter.



13 . Mount the oil filter onto the holder by hand, until the O-ring of the filter touch the holder, and then tighten the filter with tools.

Torque: 14N.m or 3/4 circle

14 . Lower the vehicle.



15 . Unscrew the engine oil filler cap.

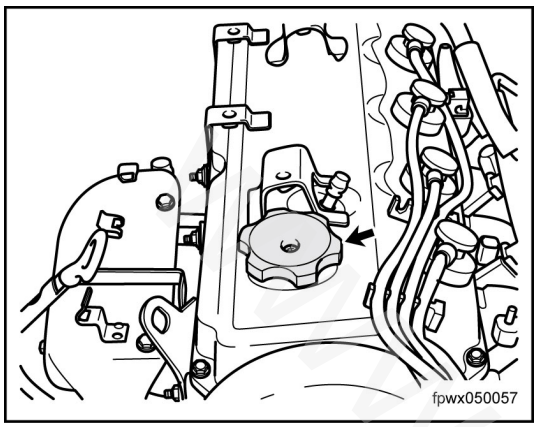
16 . Fill up the engine oil.

Engine oil: 10W/30 or 15W/40 engine oil at Grade SL or above (5W/30 engine oil for Northeast China in winter)

Filling volume: 4L

⚠ CAUTION

Only use the engine oil authorized by Foton.

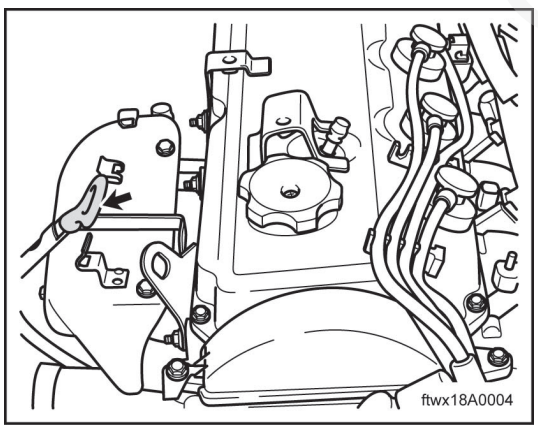


17 . Tighten the engine oil filler cap.

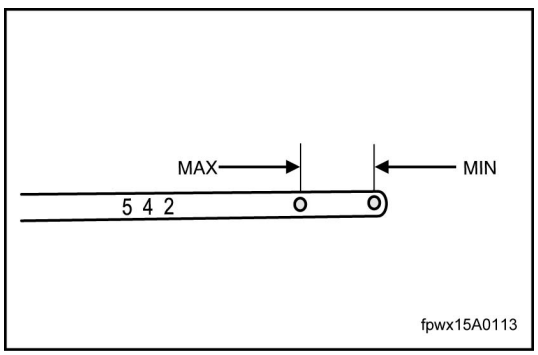
18 . Start the engine and run it at idling for a few minutes.

19 . Switch off the ignition.

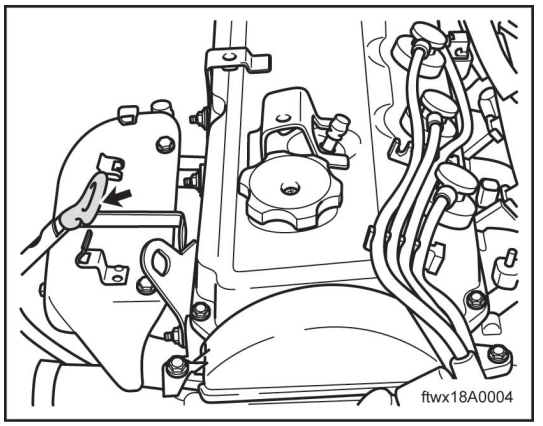
20 . Wait for a few minutes.



21 . Pull out the oil gauge.



22 . Check the engine oil level. If it is above the maximum level, drain the oil to the normal range. If it is below the minimum level, top it up to the normal range.

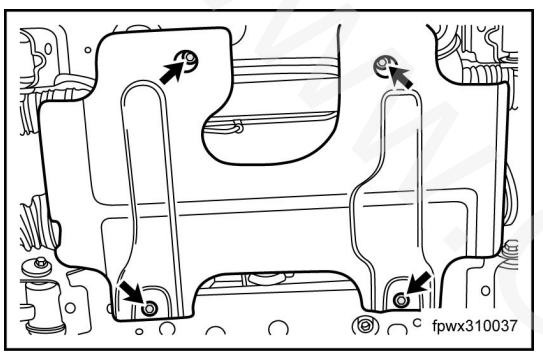


23 . Restore the oil gauge.

24 . Lift up the vehicle.

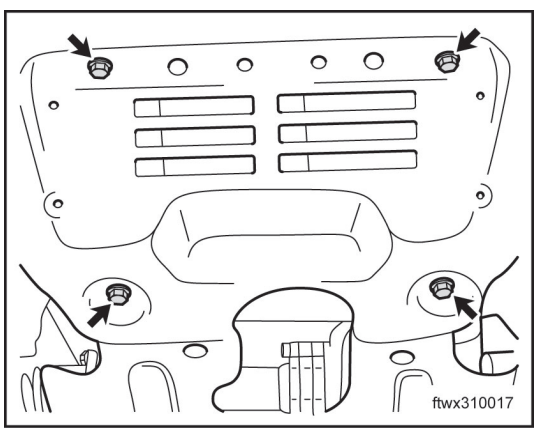
25 . Check for leakage at the oil drain hole and the connection of the oil filter.

26 . Remove the upper engine baffle:



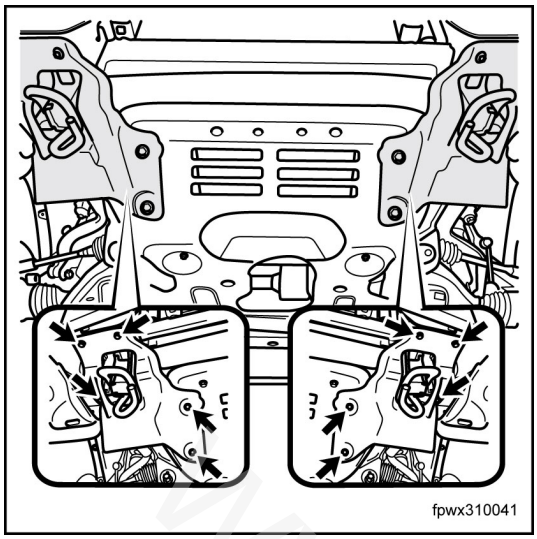
(a) Install the rear baffle and tighten the retaining bolts.

Torque: 23±2N.M



(b) Install the front baffle and tighten the retaining nuts.

Torque: 23±2N.M



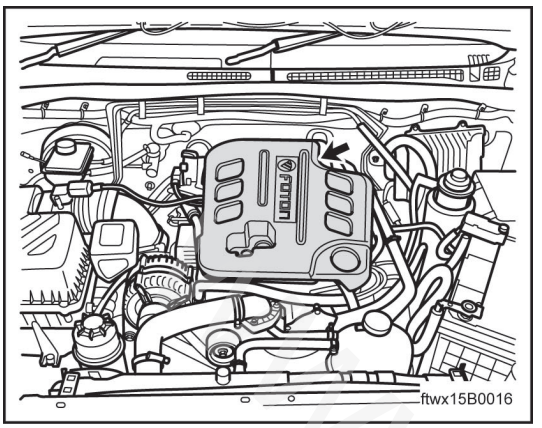
(c) Install the small baffles on both sides and tighten the retaining bolts.

Torque: 23±2N.M

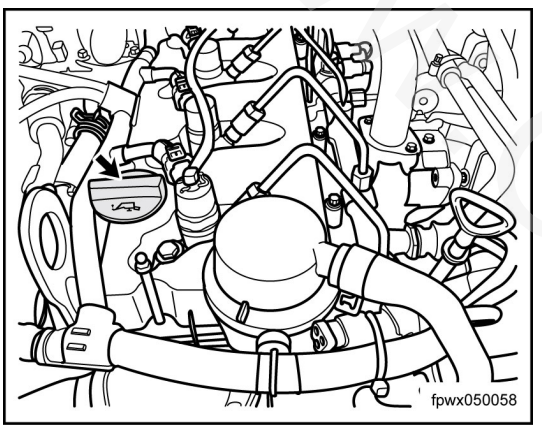
27 . Lower the vehicle.

REPLACE ENGINE OIL & OIL FILTER (ISF2.8) (REPLACEMENT)

1 . Place the vehicle on a level ground.
2 . Heat up the engine to its normal working temperature.
3 . Switch off the ignition.
4 . Wait for around 3 minutes.

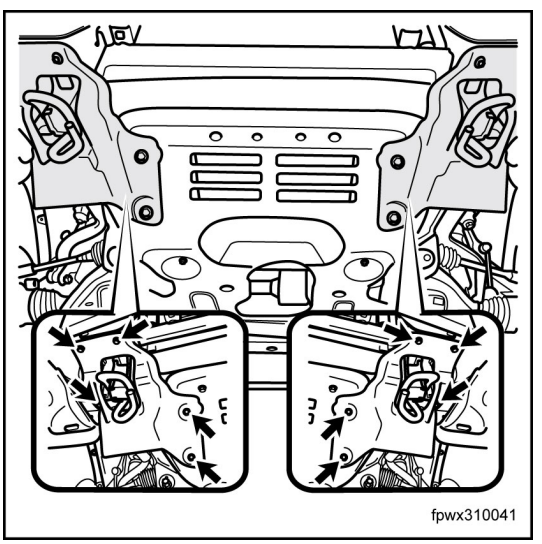


5 . Remove the upper engine hood.

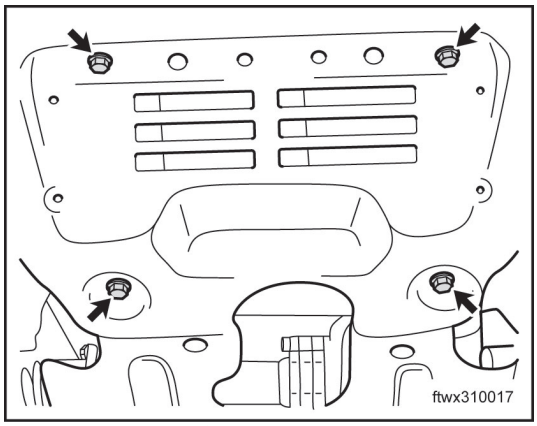


6 . Clean the engine oil filler cap with cloth and unscrew it.

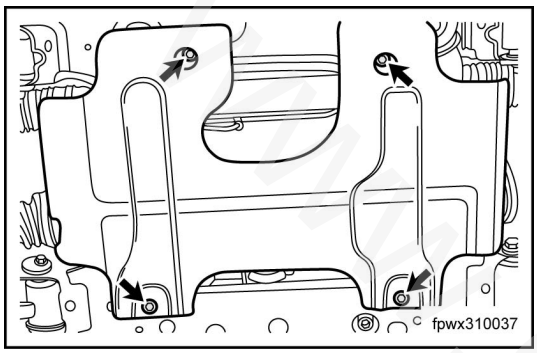
7 . Lift up the vehicle.
8 . Remove the lower engine baffle:



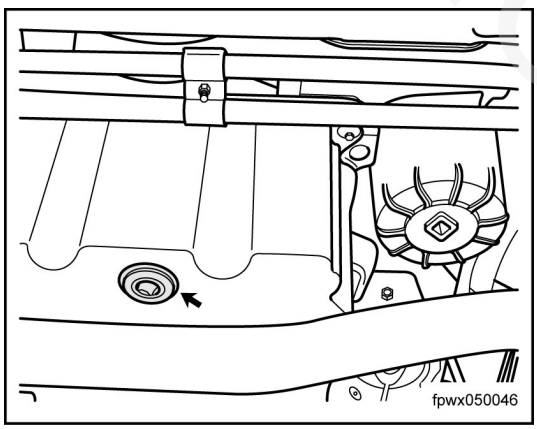
(a) Unscrew the retaining bolts of the small baffles on both sides and remove the baffles.



(b) Unscrew the retaining bolts of the front baffle and remove the baffle.



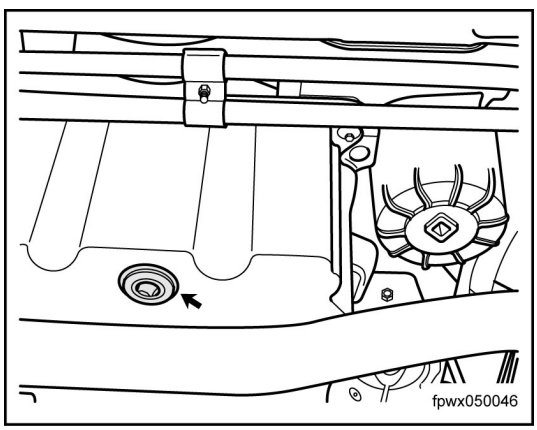
(c) Remove the retaining bolts of the rear baffle and then the baffle.



9 . Use the tools to remove the oil drain plug and drain the engine oil.

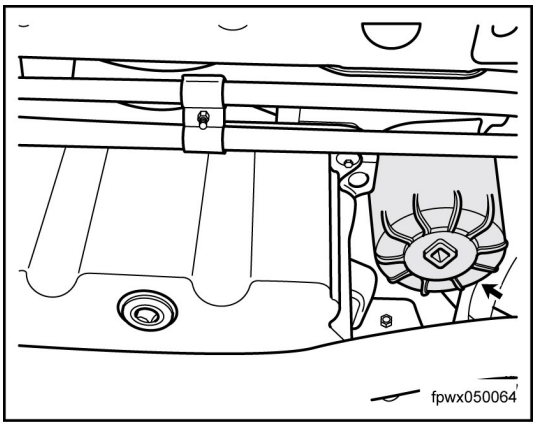
⚠ CAUTION

- **When draining, be careful of possible burns caused by hot engine oil.**
- **The drained engine oil shall be properly collected and treated as regulated.**



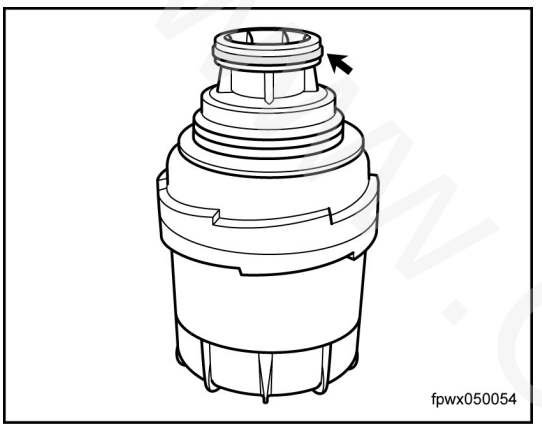
10 . Once completely drained, replace a new drain plug gasket, tighten the drain plug and clean the dirt.

Torque: 24±4N•m

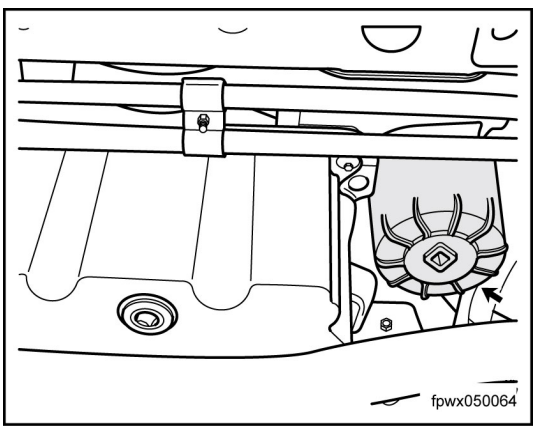


11 . Use the tools to remove the oil filter and replace a new one.

12 . Clean the interface between the oil filter holder and the filter.



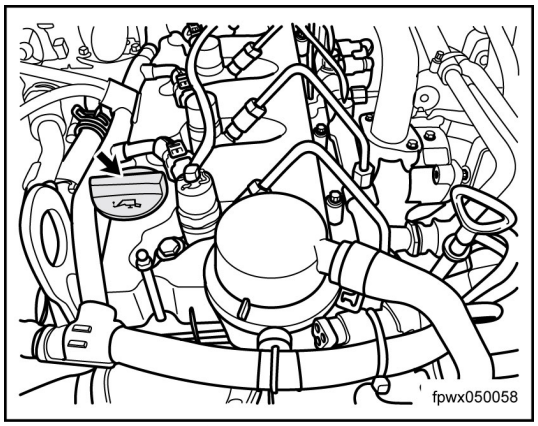
13 . Apply a small amount of engine oil on the O-ring of the new oil filter.



14 . Mount the oil filter onto the holder by hand and then tighten the filter with tools.

Torque: 38N•m

15 . Lower the vehicle.



16 . Unscrew the engine oil filler cap.

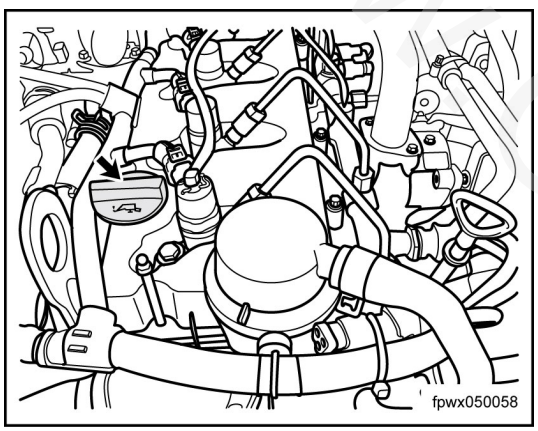
17 . Fill up the engine oil.

Engine oil: CH-4 or above

Filling volume: 4.5～5L

⚠ CAUTION

Only use the engine oil authorized by Foton.

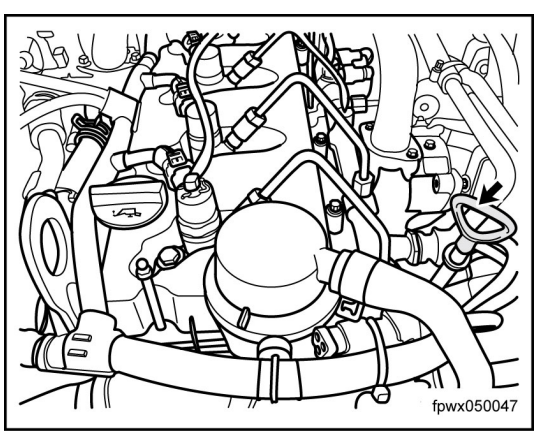


18 . Tighten the engine oil filler cap.

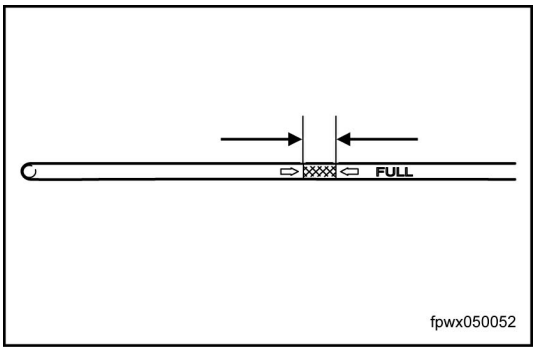
19 . Start the engine and run it at idling for a few minutes.

20 . Switch off the ignition.

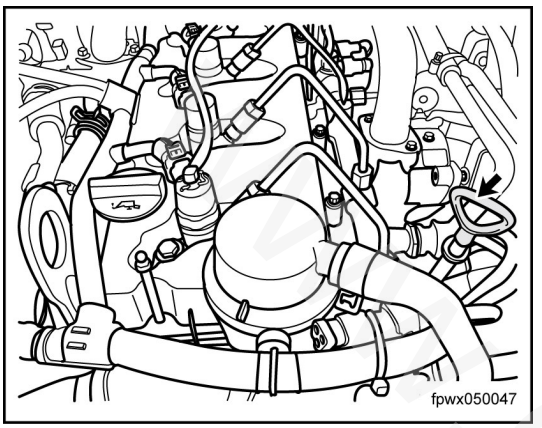
21 . Wait for a few minutes.



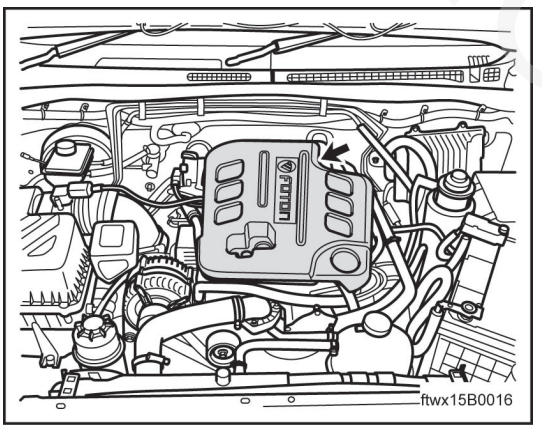
22 . Pull out the oil gauge.



23 . Check the engine oil level. If it is above the maximum level, drain the oil to the normal range. If it is below the minimum level, top it up to the normal range.



24 . Restore the oil gauge.

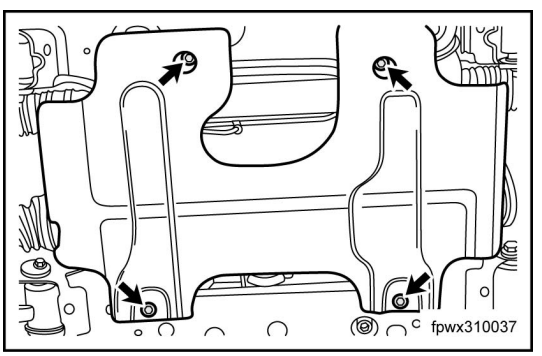


25 . Install the upper engine hood.

26 . Lift up the vehicle.

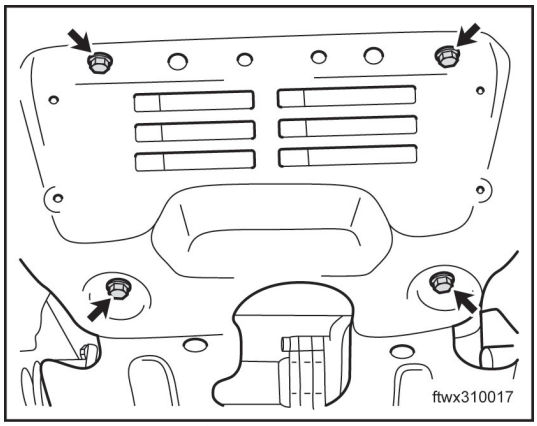
27 . Check for leakage at the oil drain hole and the connection of the oil filter.

28 . Remove the upper engine baffle:



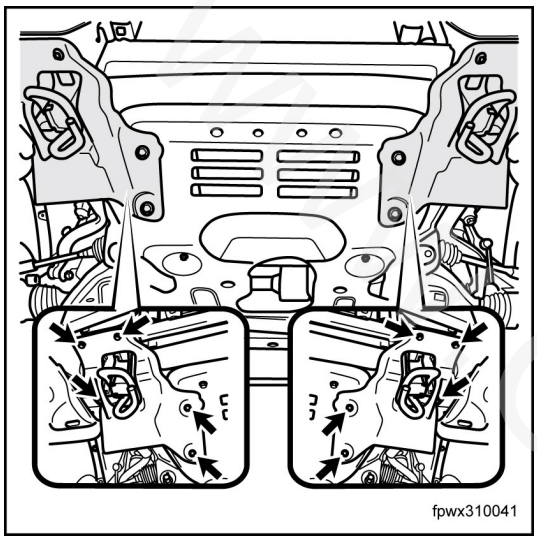
(a) Install the rear baffle and tighten the retaining bolts.

Torque: 23±2N•m



(b) Install the front baffle and tighten the retaining nuts.

Torque: 23±2N•m



(c) Install the small baffles on both sides and tighten the retaining bolts.

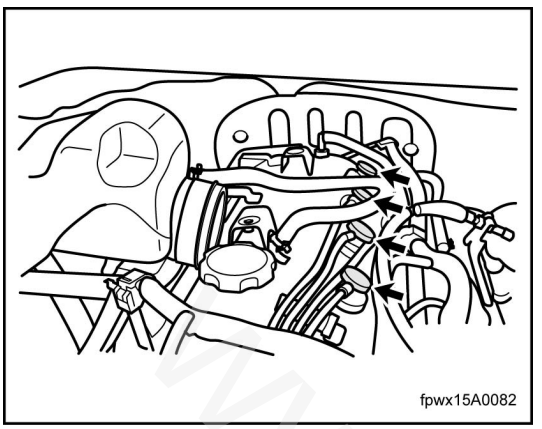
Torque: 23±2N•m

29 . Lower the vehicle.

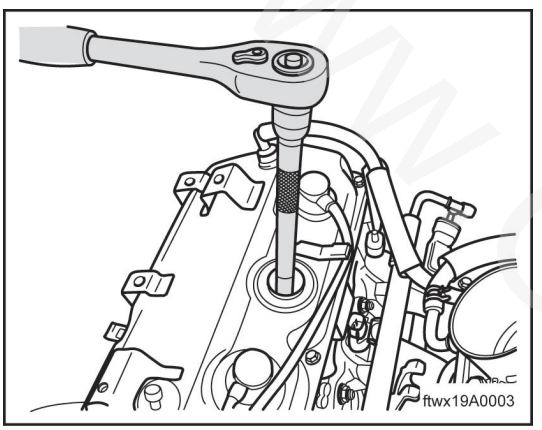
REPLACE SPARK PLUG (4G69)

1 . Switch off the ignition.

2 . Disconnect battery negative cable. (Refer to "Chapter 20. Start & charge - battery, replacement")



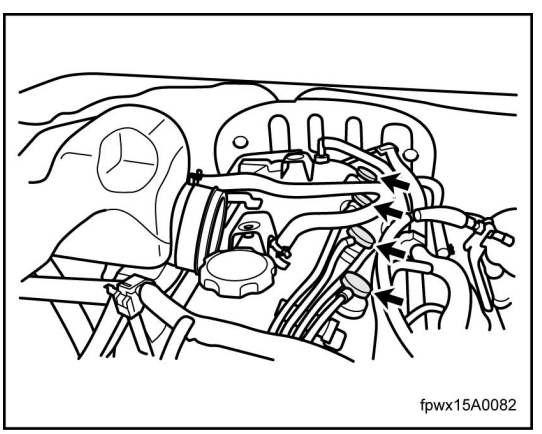
3 . Pull out the spark plug cable.



4 . Remove the spark plug with tools.

5 . Replace a new spark plug and tighten it onto the cylinder head.

Torque:25N•m



6 . Install the spark plug cable to the rock arm cap.

7 . Connect battery negative cable. (Refer to "Chapter 20. Start & charge - battery, replacement")

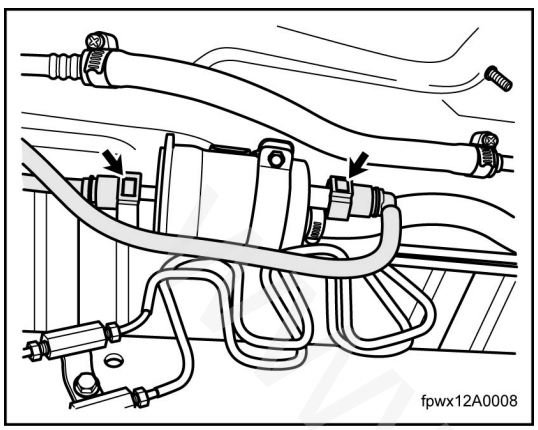
REPLACE FUEL FILTER ASSEMBLY (4G69)

⚠ CAUTION

Before replacing the fuel filter, ensure fire extinguishers are properly equipped at the site.

1 . Discharge the pressure in the fuel system. (Refer to "Chapter 12A. Fuel - fuel system, precaution")

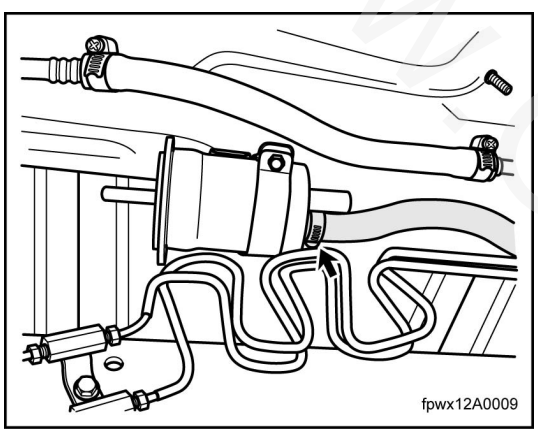
2 . Lift up the vehicle.



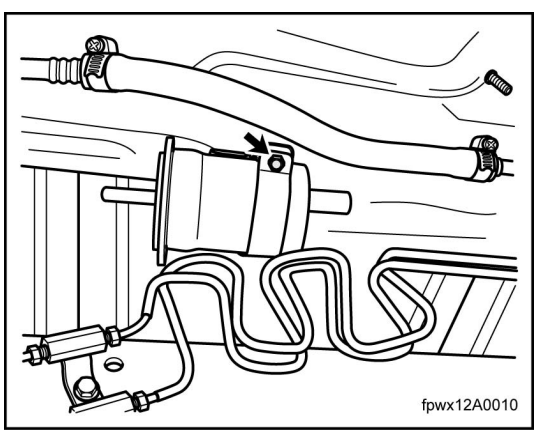
3 . Press the locking block and remove the fuel filter connector.

⚠ CAUTION

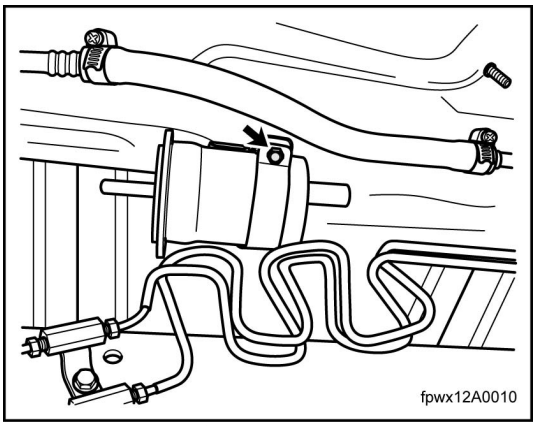
Before removing the connector, place a specified vessel right beneath it, which will prevent the fuel from contaminating the site.



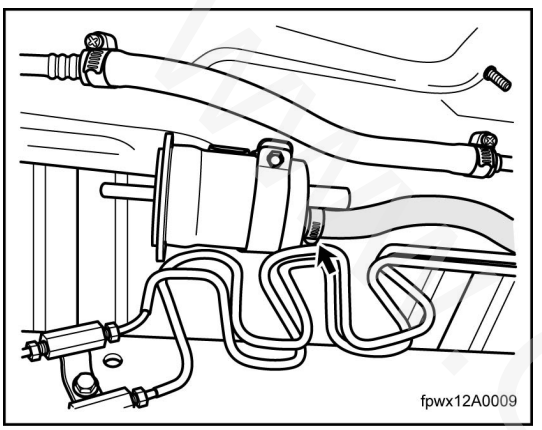
4 . Unscrew the clip bolt and remove the hose.



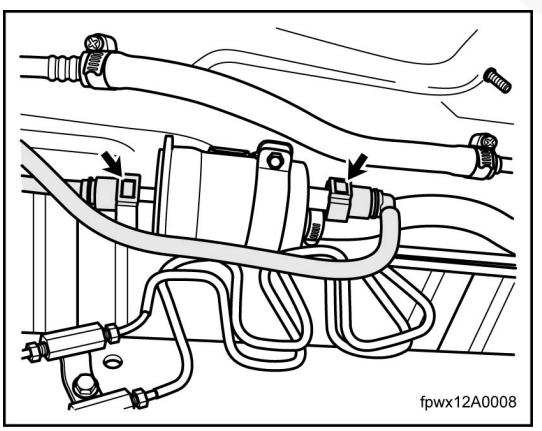
5 . Unscrew the retaining bolts of the fuel filter and remove the filter assembly.



6 . **Install a new fuel filter assembly and tighten the retaining bolts.**



7 . **Install the hose and tighten the clip bolts.**



8 . **Mount the fuel filter connector until you hear the click.**

9 . **Lower the vehicle.**

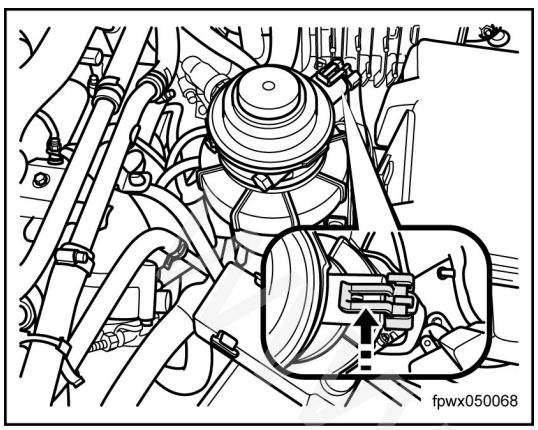
REPLACE FUEL FILTER ELEMENT (ISF2.8)

⚠ **CAUTION**

Before replacing the fuel filter, ensure fire extinguishers are properly equipped at the site.

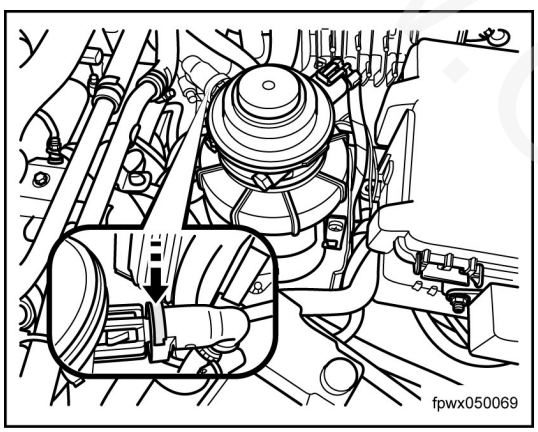
1 . Switch off the ignition.

2 . Disconnect battery negative cable. (Refer to "Chapter 20. Start & charge - battery, replacement")

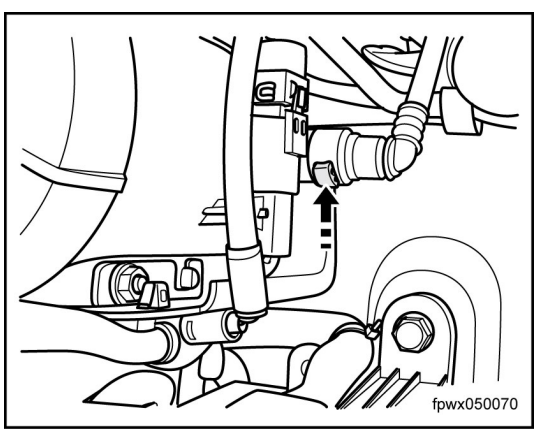


3 . Remove the diesel filter & heater connector.

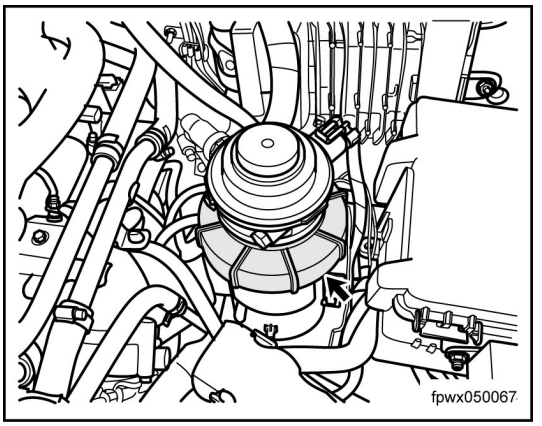
4 . Drain the fuel inside the fuel filter:



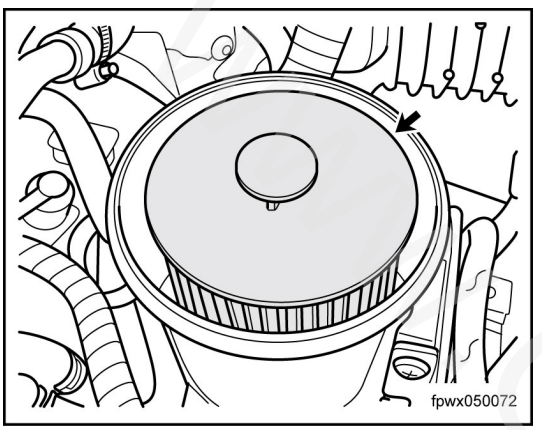
(a) Press the locking pin while removing the fuel pipe.



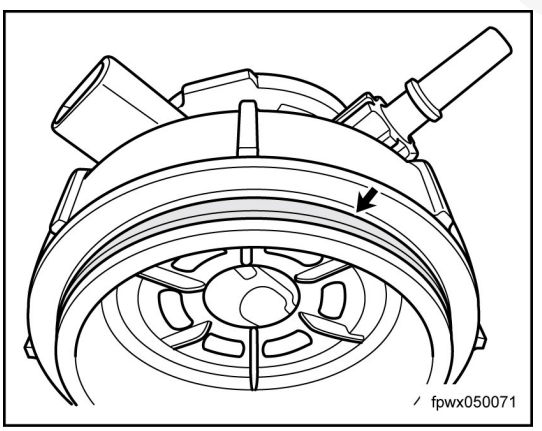
(b) Press the locking pin while removing the fuel pipe. Collect the drained fuel with a specified vessel.



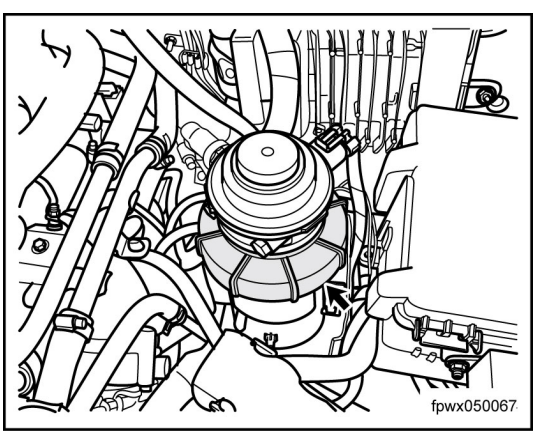
5 . **Remove the diesel filter & heater connector.**



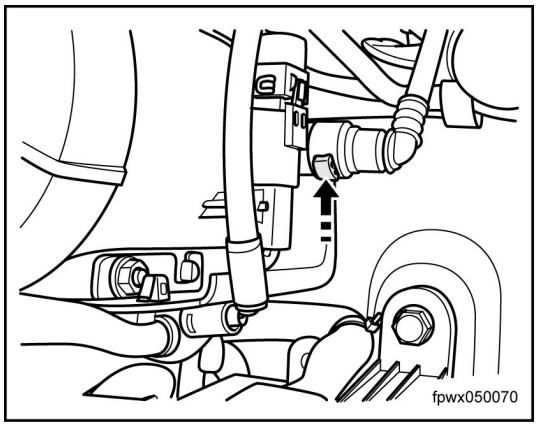
6 . **Remove the fuel filter element and replace it with a new one.**



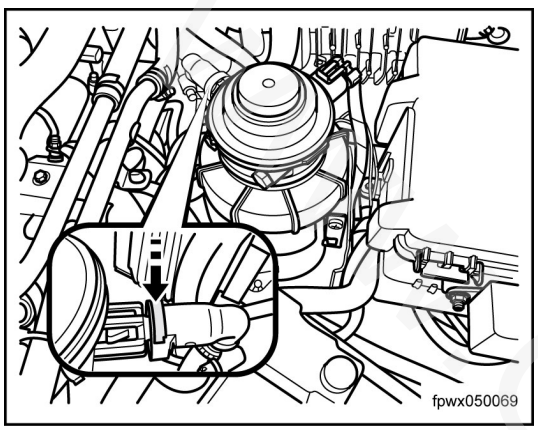
7 . **Replace a new O-ring and apply some engine oil on the surface.**



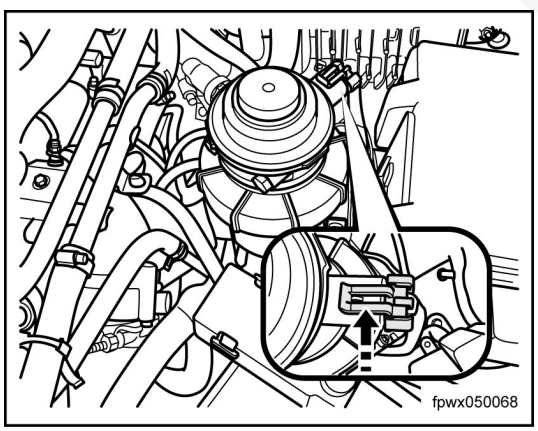
8 . **Install the cap and tighten it by turning 3 and a half circles clockwise.**



9 . Restore the fuel pipe until you hear the click.

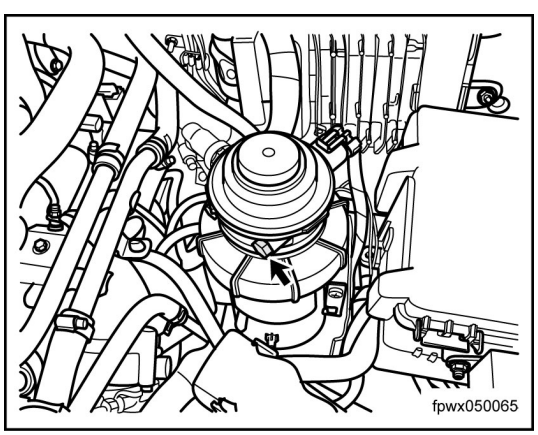


10 . Restore the fuel pipe until you hear the click.

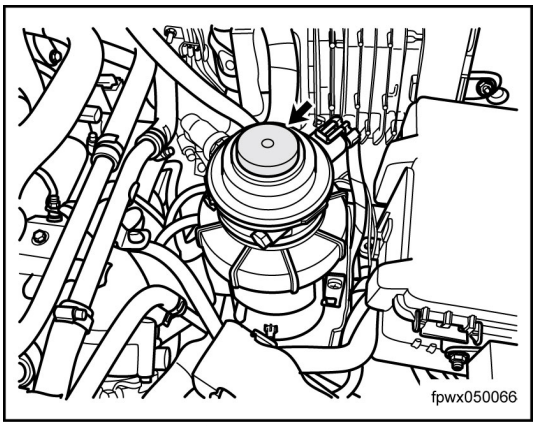


11 . Restore the diesel filter & heater connector until you hear the click.

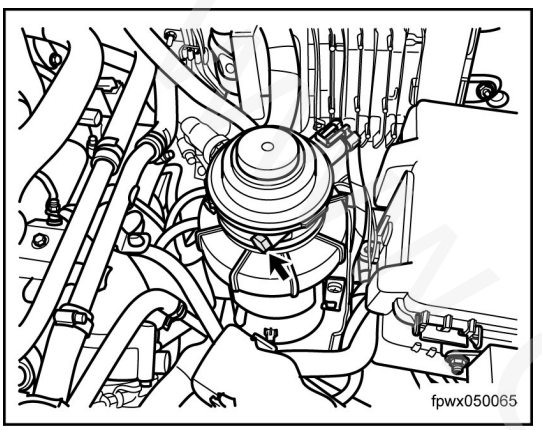
12 . Discharge the air inside inside the fuel filter:



(a) Unscrew the discharge screw.



(b) Press the cover and pump the fuel manually, until fuel spills front he discharge screw.



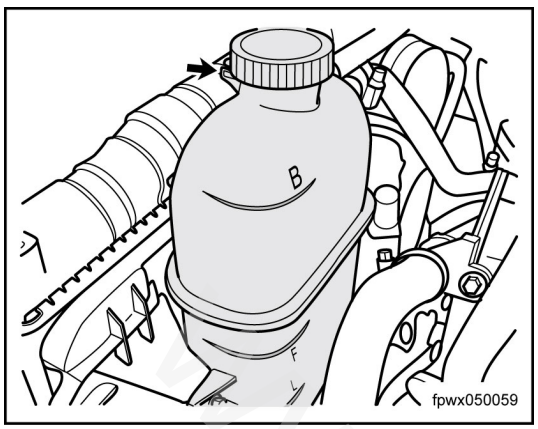
(c) Tighten the discharge screw.

13 . Connect battery negative cable. (Refer to "Chapter 20. Start & charge - battery, replacement")

REPLACE COOLANT

1 . Switch off the ignition.

2 . Wait until the engine cools down.



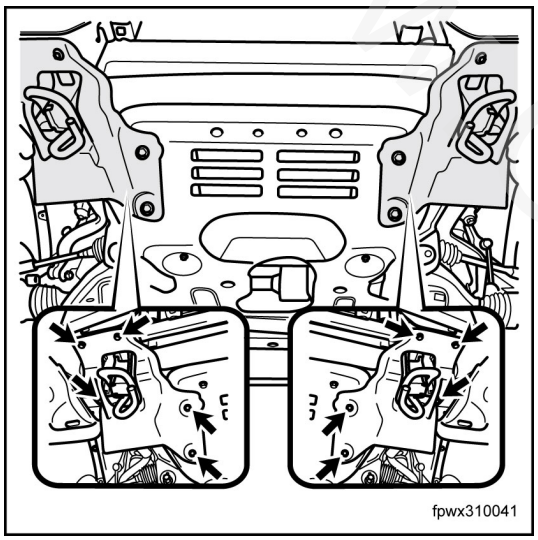
3 . Slowly open the coolant filler cap.

! DANGER

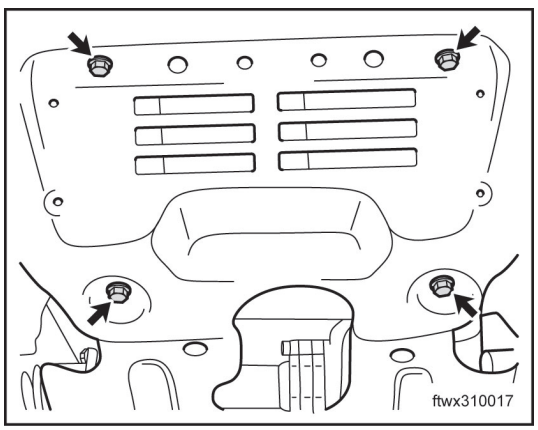
Do not open the coolant filler cap before the engine cools down to the ambient temperature. Otherwise the hot coolant or steam may lead to personal injury.

4 . Lift up the vehicle.

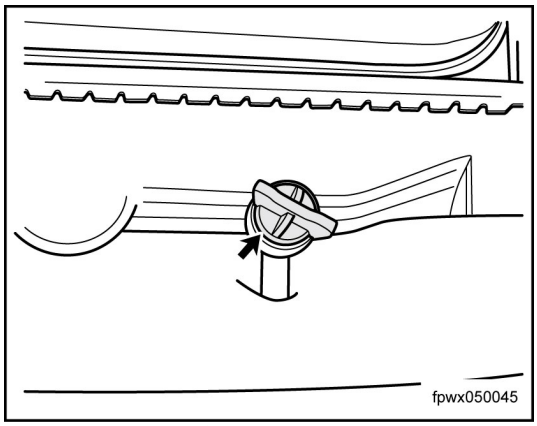
5 . Remove the lower engine baffle:



(a) Unscrew the retaining bolts of the small baffles on both sides and remove the baffles.



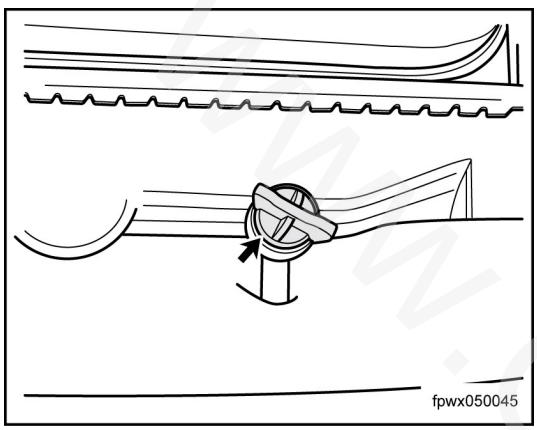
(b) Unscrew the retaining bolts of the front baffle and remove the baffle.



6 . Slowly unscrew the coolant drainage plug and drain the coolant.

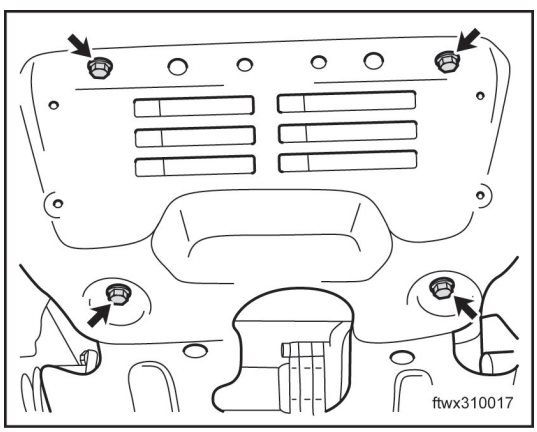
⚠ CAUTION

Collect the coolant in a specified container. If not recycled, it shall be disposed properly.



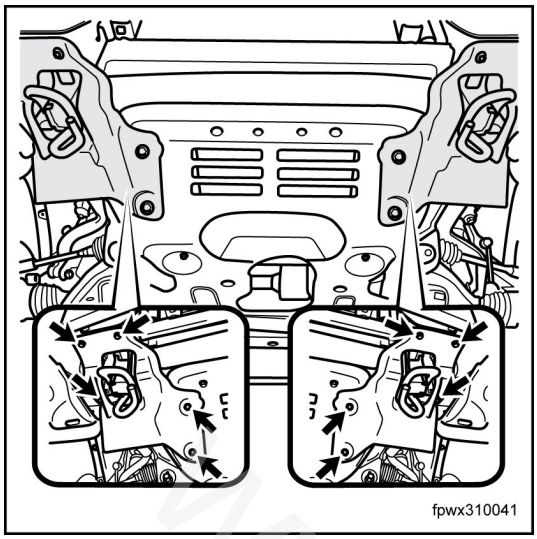
7 . Once the coolant is drained up, tighten the plug.

8 . Remove the upper engine baffle:



(a) Install the front baffle and tighten the retaining nuts.

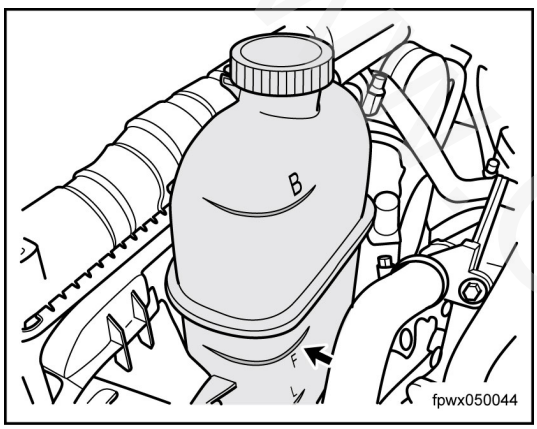
Torque: 23±2N•m



(b) Install the small baffles on both sides and tighten the retaining bolts.

Torque: 23±2N•m

9 . Lower the vehicle.



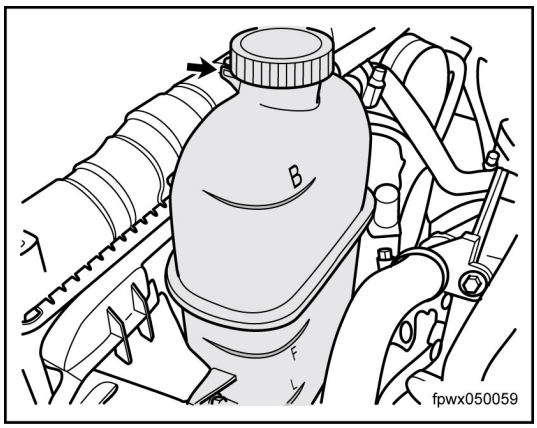
10 . Top up the engine coolant to the specified level.

Filling volume(4G69): 6～7L

Filling volume(ISF2.8): 8～9L

⚠ CAUTION

Only use the engine coolant authorized by Foton.



11 . Tighten the coolant filler cap.

⚠ CAUTION

Remember to turn the free point on the inlet cap to that between the two free points on the inlet.

12 . Start the engine and accelerate to 2,500 RPM, until the electronic fan runs quickly. Check whether the coolant in the coolant reservoir reaches the specified level. If not, continue to top it up to the said level.

REPLACE BRAKING FLUID

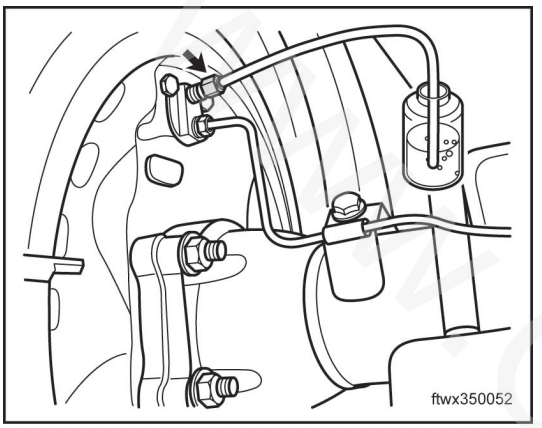
⚠ CAUTION

- **Only use the braking fluid authorized by Foton.**
- **Do not mix the braking fluids of different brands and types, or it may affect the braking performance.**
- **If your skin is in contact with braking fluid, rinse it with water immediately.**
- **The drained braking fluid should be collected and treated as regulated.**

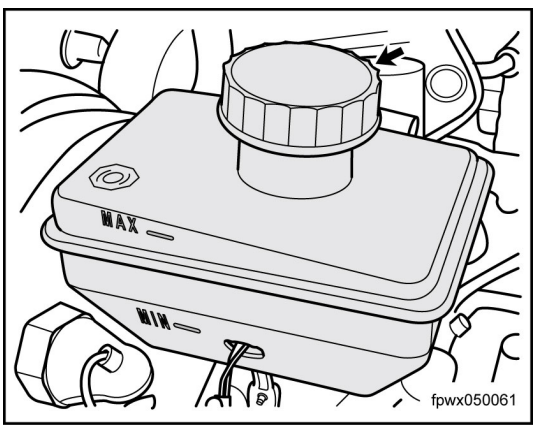
1 . Switch off the ignition.

2 . Open the engine hood.

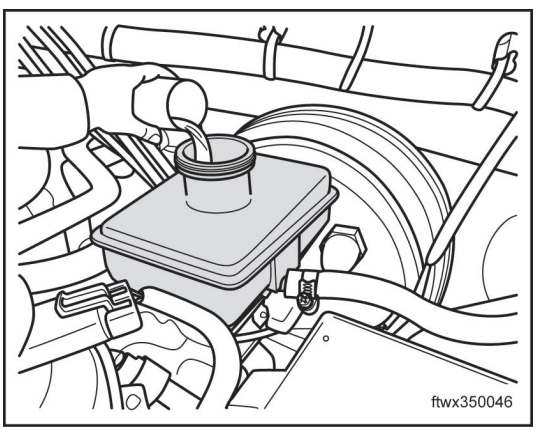
3 . Drain the braking fluid:



(a) Connect the discharge screw and the collection vessel with a clear plastic hose.

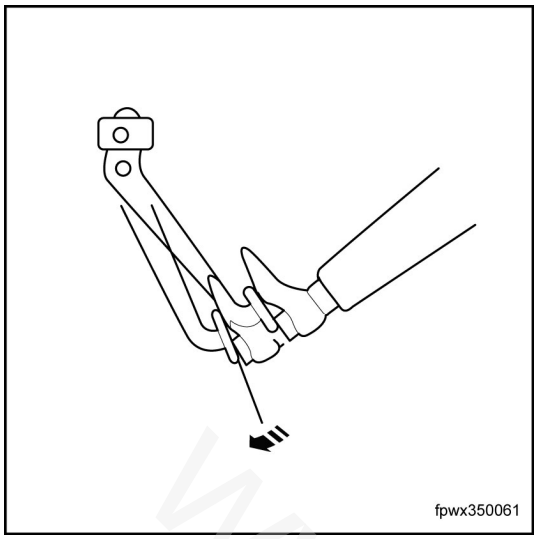


(b) Unscrew the filler cap of the braking fluid tank.

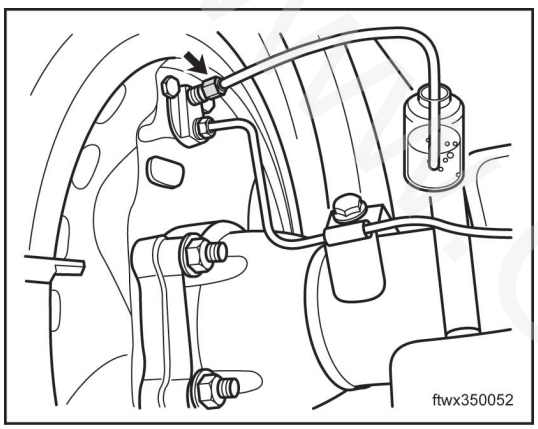


(c) Drain the fluid and top it up depending on the level.

Brake fluid model: 7104-1



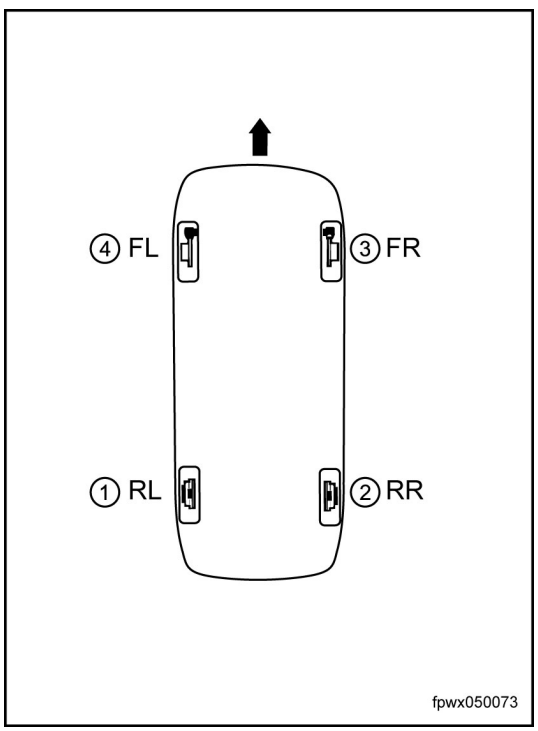
- **A mechanic shall press the brake pedal by full force for 7-9 times and hold it in position.**



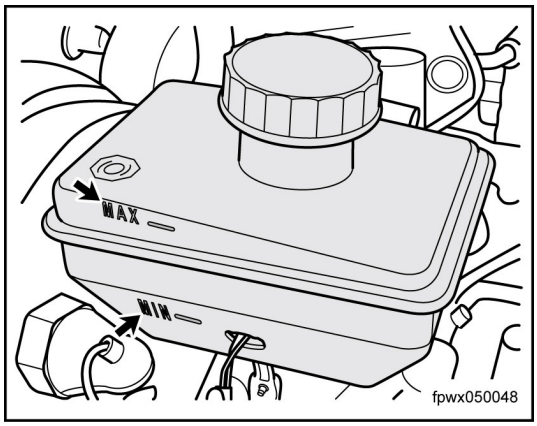
- **The other mechanic unscrews the braking fluid discharge screw, until the pressed brake pedal moves downward. Immediately tighten the discharge screw.**

(d) Repeat Step 3, until fresh braking fluid flows out of the discharge screw. Tighten the discharge screw.

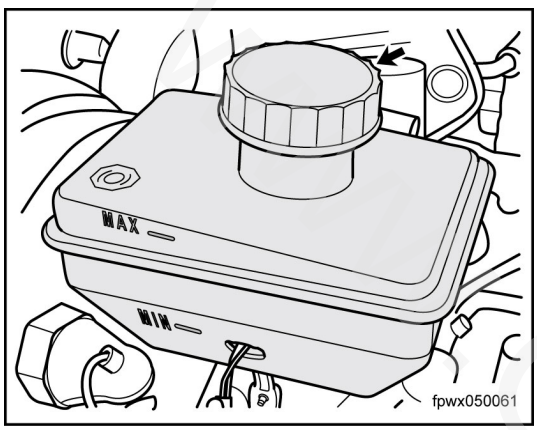
(e) Clean the dirt on the discharge screw.



4 . Drain the braking fluid as illustrated in Step 1, subject to the sequence shown in the figures.



5 . After the drainage, top the braking fluid inside the tank up to the standard range.



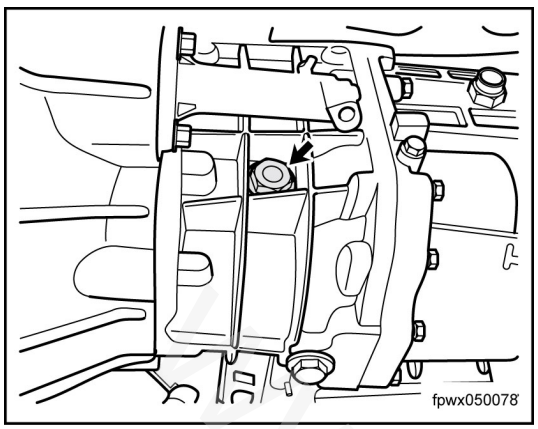
6 . Tighten the filler cap of the braking fluid tank.

7 . Restore the engine hood.

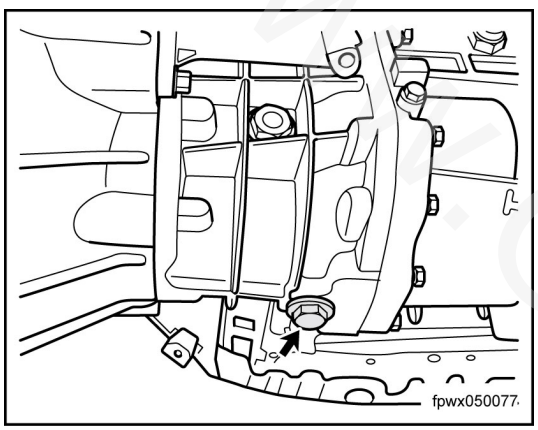
REPLACE MANUAL GEARBOX LUBRICANT (JC538)

1 . Switch off the ignition.

2 . Lift up the vehicle.



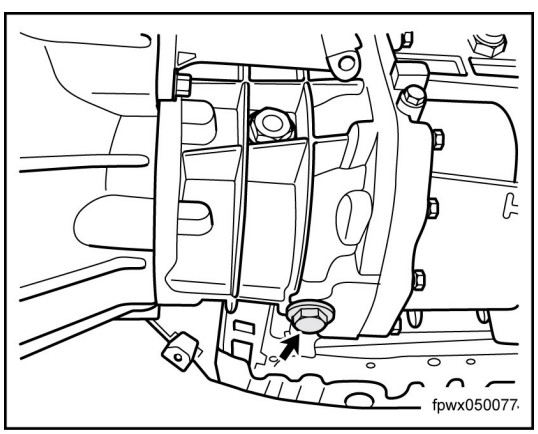
3 . Unscrew the gearbox filler bolt.



4 . Unscrew the gearbox drain bolt and drain the lubricant.

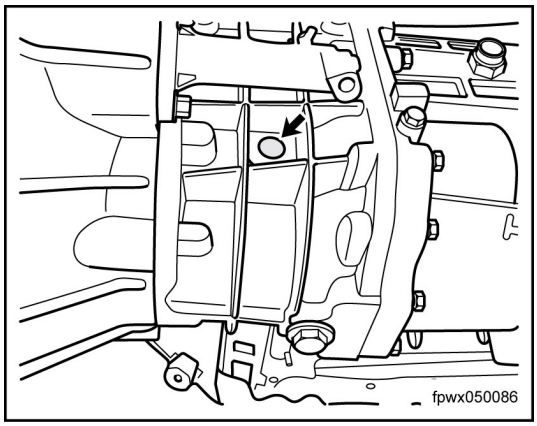
⚠ CAUTION

The drained lubricant shall be properly collected and treated as regulated.



5 . Once completely drained, tighten the drain bolt.

Torque: 65 ~ 78N•m



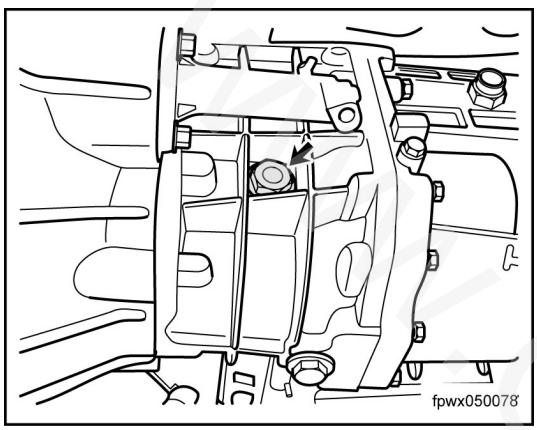
6 . Top the gearbox lubricant from the filler until it overflows from the hole.

Gearbox lubricant model: GL-4 75W/90

Filling volume: 1.6L

⚠ CAUTION

Only use the gearbox lubricant authorized by Foton.



7 . Tighten the filler bolt and clean the dirt.

Torque: 65 ~ 78N•m

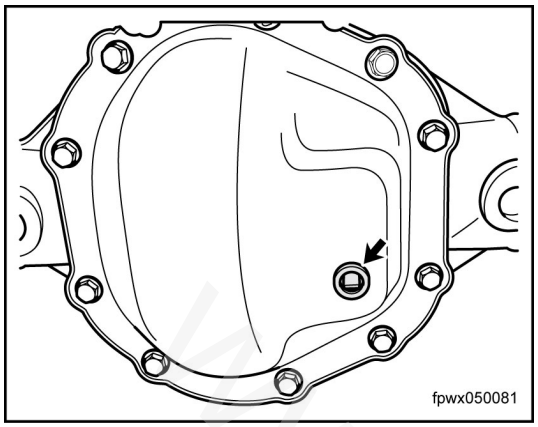
8 . Check for leakage at the bolt.

9 . Lower the vehicle.

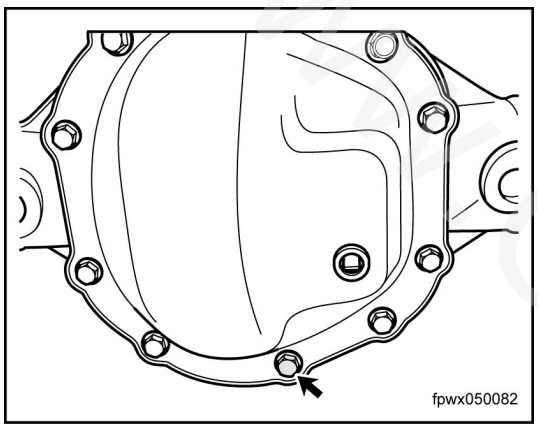
REPLACE REAR MAIN REDUCER GEAR OIL

1 . Switch off the ignition.

2 . Lift up the vehicle.



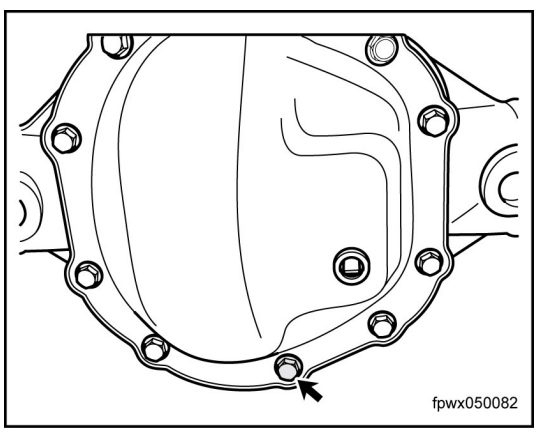
3 . Unscrew the rear main reducer filler plug.



4 . Unscrew the rear main reducer drain plug and drain the gear oil.

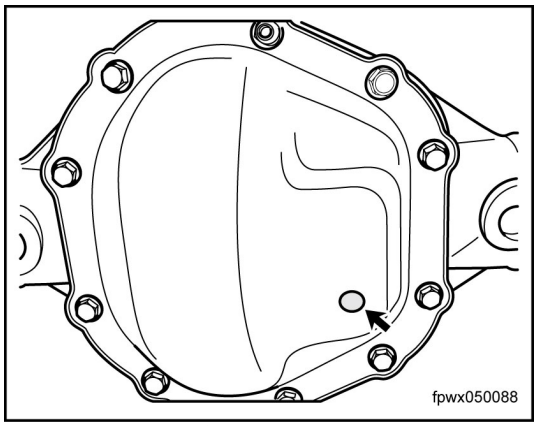
⚠ CAUTION

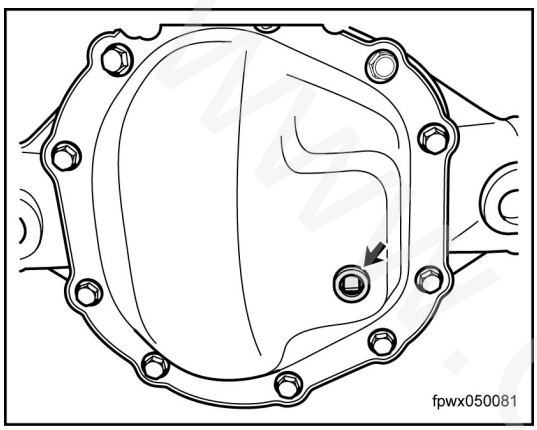
The drained gear oil shall be properly collected and treated as regulated.



5 . Once completely drained, tighten the drain bolt.

Torque: 38 ~ 45N•m





8 . **Check for leakage at the bolt.**

9 . **Lower the vehicle.**

6 . **Use tools to add rear main reducer gear oil at the filler, and additive as well for LSD.**

Additive model: Houghton Sturaco 7098

Filling volume: Approx. 0.06L

Gear oil model: GL-5 85W/90

Filling volume: (1.27±0.03)L

⚠ CAUTION

Only use the rear main reducer gear oil authorized by Foton.

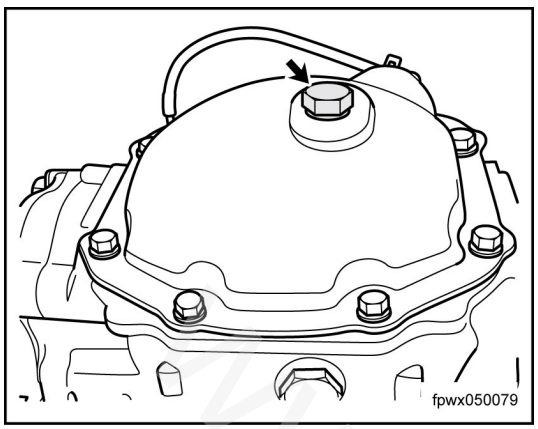
7 . **Tighten the filler plug and clean the dirt.**

Torque: 27 ~ 41N•m

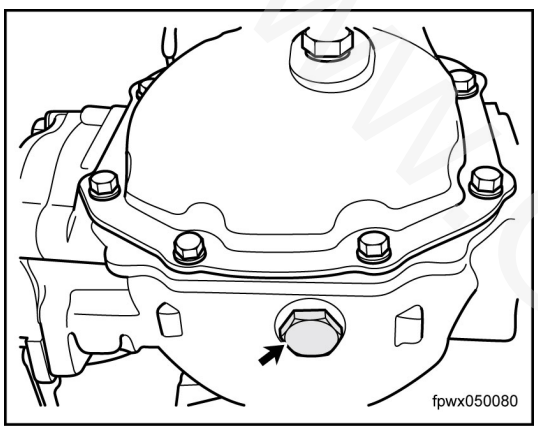
REPLACE FRONT MAIN REDUCER GEAR OIL (4WD)

1 . Switch off the ignition.

2 . Lift up the vehicle.



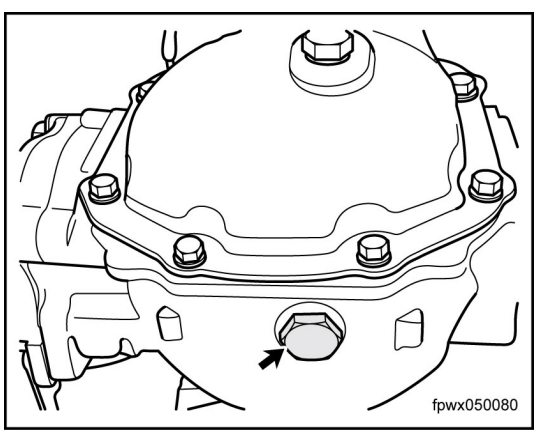
3 . Unscrew the front main reducer filler plug.



4 . Unscrew the front main reducer drain plug and drain the gear oil.

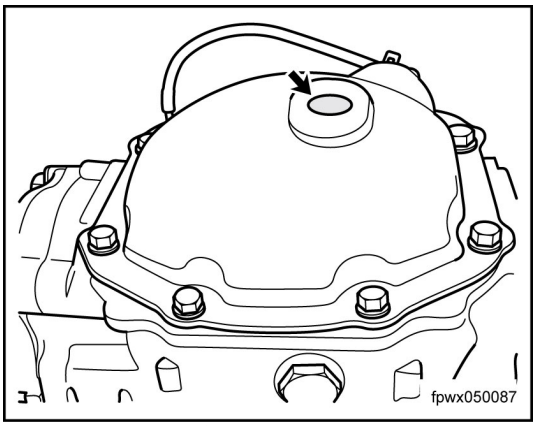
⚠ CAUTION

The drained gear oil shall be properly collected and treated as regulated.



5 . After completely drained, replace the drain bolt gasket and tighten the drain bolt.

Torque: 59 ~ 69N•m



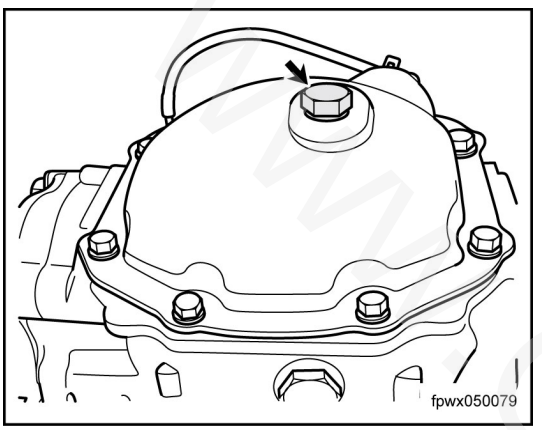
6 . Use tools to front main reducer gear oil at the filler.

Gear oil model: GL-5 85W/90

Filling volume: 1.2L

⚠ CAUTION

Only use the front main reducer gear oil authorized by Foton.



7 . Replace the filler bolt gasket, tighten the filler bolt and clean the dirt.

Torque: 41 ~ 51N•m

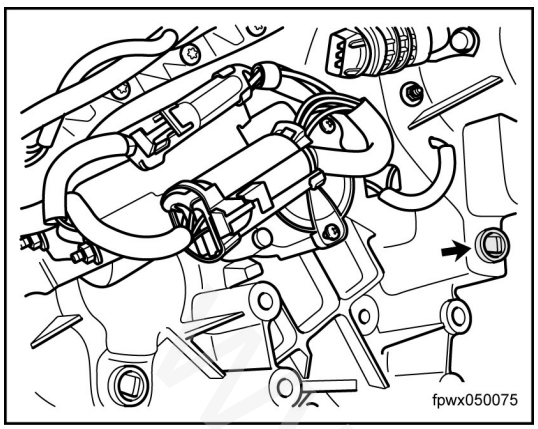
8 . Check for leakage at the bolt.

9 . Lower the vehicle.

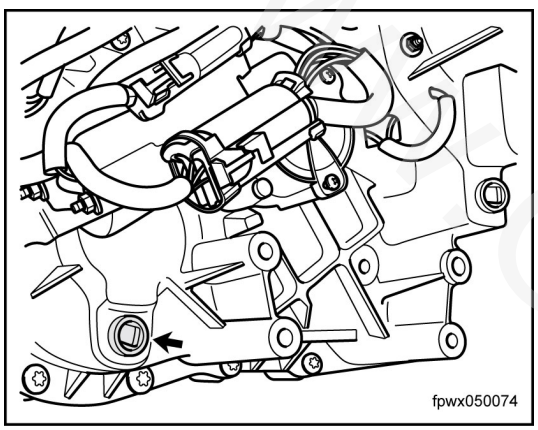
REPLACE DIFFERENTIAL OIL (4WD)

1 . Switch off the ignition.

2 . Lift up the vehicle.



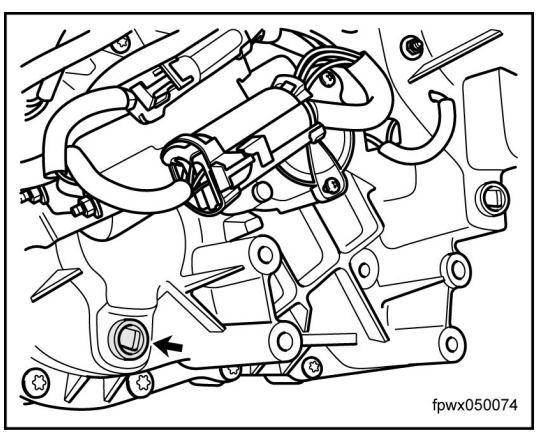
3 . Unscrew the differential filler plug.



4 . Unscrew the differential drain plug and drain the differential oil.

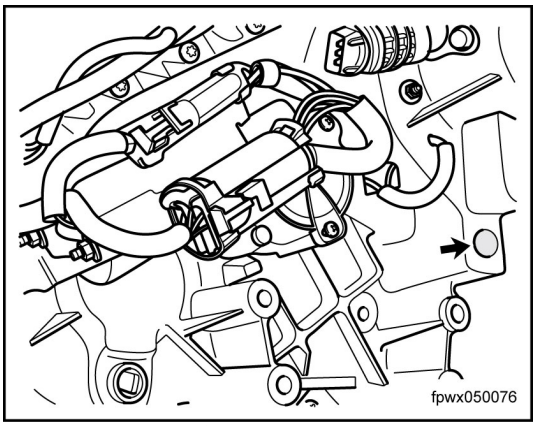
⚠ CAUTION

The drained differential oil shall be properly collected and treated as regulated.



5 . After completely drained, tighten the differential drain plug.

Torque: 19 ~ 30N·m



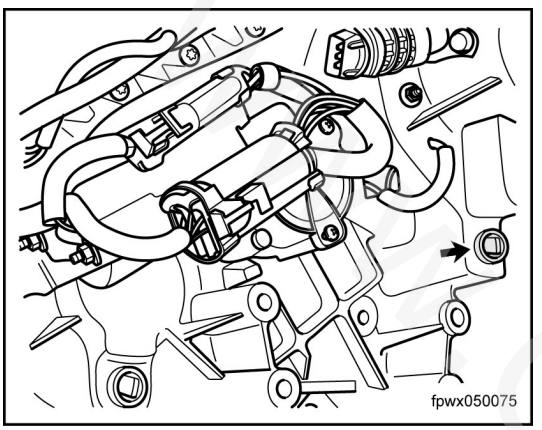
6 . Use tools to top the differential oil up at the filler, until it overflows the hole.

Differential oil model: SPEC40－00－244－001

Filling volume: 1.33～1.52L

⚠ CAUTION

Only use the differential oil authorized by Foton.



7 . Tighten the filler plug and clean the dirt.

Torque: 19 ~ 30N•m

8 . Check for leakage at the bolt.

9 . Lower the vehicle.

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